

Ancient Pakistan - An Archaeological History

Volume III
Harappan Civilization - The Material Culture

Mukhtar Ahmed

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Ancient Pakistan – An Archaeological History consists of the following five volumes, of which the *Harappan Civilization - the Material Culture* is the third:

Volume I. The Stone Age
Volume II. A Prelude to Civilization
Volume III. Harappan Civilization - The Material Culture Volume IV. Harappan Civilization - Theoretical and the Abstract Volume V. The End of the Harappan Civilization, and the Aftermath

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Foreword to *Ancient Pakistan – An Archaeological History*



Politically, Pakistan is a new state. Historically, however, its outlines can be traced back to at least 50,000 years. Pakistan is an Islamic state but culturally it is byproduct of a multitude of historical processes, of which Islam is only the most recent component. These

historical processes were primarily the result of geographical and geological features of the land, which have shaped not only her history but prehistory as well. Through these processes, this piece of land, irrespective of its names and political configurations at differing times, emerged as a distinct cultural entity at a very early stage and, as such, it deserves a historical treatment separate from India and separate from Central Asia. This book, spread over five volumes, is a partial answer to this need.

In undertaking this work, I have been all too aware that ultimately this exercise bore upon the existence of Pakistan from the very early times as a unique geographical and cultural reality, of which the Indus Civilization was only one of the several manifestations that are known to the general public. This reality, long ignored, is indeed a cornerstone of the present work. As the reader proceeds with the narration, he or she realizes that age by age, period by period, region by region, cultural traits are born, grow, and change as they interweave with other traits and form institutions, social behavior, cultural values, and technological bases that together make up the prehistory of Pakistan. In this process, the reader also realizes that this history is quite different from that we come across in the east of the Indus Valley or to the north and the west of the Hindu Kush Mountains.

Pakistan has been an area of intensive archaeological research for over a century. In recent times the pace of this research has increased manifold, and despite some major unknown areas, we have reached a stage of knowledge where it is possible to offer a connected account of the prehistory of this land primarily, if not exclusively, on the basis of archaeology. The present work aims to do that. It is, however, much more than a compendium of archaeological data of ancient time, bringing out, as it does, the flow of Pakistan's grass-root archaeological history in all its continuities and diversities.

It is an attempt to sum up the heritage of the remote past of this vast and in so many ways a unique region to which we owe our present e'lan in South Asia. It has twofold ambition, to embrace the remote past of the Greater Indus Region, now called Pakistan, in its entirety and to sum up all that we

know about that past at the present time. It adopts an intellectual approach that is more interpretative than descriptive, placed in a universal frame of reference. Pakistan's history and prehistory has been traditionally told in context with "India" or the Indian subcontinent, often termed as South Asia; this book parts company with its predecessors on several essential points. In the first place, it deliberately confines itself to shedding light on only one geographic area of South Asia rather than attempting to search for some kind of elusive unity in clearly diverse region. Secondly, it concentrates on the history of cultural development rather than on events.

Beginning with the first stone tools in Pothwar in the north of Punjab, the book traces the archaeological history of this land and examines the multiple strands of cultural development that weave the prehistory of this country all the way to its early historic foundations. Among other things, it discusses the basic significance of the prehistoric studies of the Greater Indus Valley, the variegated pattern of the beginning of human existence in Pothwar through the course of the Ice Age; the beginning of agriculture and village life in Baluchistan and western Sind; the evolution of a prehistoric high culture that came to be known as the Indus or Harappan Civilization; the examination of the possible causes of the decay and demise of the Indus way of life and its transformation into a culture which, for lack of any other suitable name, we must refer to as the Vedic transformation. This material has been arranged as follows:

Volume I: *The Stone Age:* This volume deals with the question of the early hominins that populated this land in the remotest past, the stone tool technologies and their transformation with time, and the direction that these traditions were setting for the coming agricultural revolution. Chronological;lie, this volume covers the time period from *ca.* 2 million BC to *ca.* 10,000 BC.

Volume II: *A Prelude to Civilization:* This volume essentially covers the beginning of agriculture and animal domestication in Pakistan, development of farming villages, and the evolution of the Early Indus cultures throughout the Greater Indus Valley, along with the concomitant changes in artifactual technology, the pottery, the art, and the subsistence practices. It leaves the Indus man at the doorsteps of an urban society, namely, the Indus or the Harappan Civilization. This volume covers a time period between ca. 10,000 BC to 2,500 BC.

Volume III: *Harappan Civilization - The Material Culture.* As the title implies, it covers the rise and fall of the material culture of the Harappan Civilization. This volume covers the time period between *ca.* 2,500 BC to 1,800 BC.

Volume IV: *Harappan Civilization - Theoretical and the Abstract.* This volume deals with a few theoretical and abstract issues, such as the language and the script, the religion, the social organization, and the nature of the Harappan state, etc, which could not be dealt in other volumes. Like Volume III, this volume also deals with the time period between ca. 2500 BC and 1800 BC.

Volume V: *The End of the Harappan Civilization, and the Aftermath.* This volume deals with the decay and demise of the Indus Age, the examination of of the various degenerated local cultures that replaced the Harappan Civilization, causes and enabling factors assigned to this decay, and the problem of the advent of the Indo-Aryans in the greater Indus Valley. This material is connected with the time period between *ca.* 2000 BC and the middle of the first millennium BC.

These five volumes cover an immensely long period of time and encompass a large set of archaeological data. A certain level of previous knowledge about the subject is needed to fully

comprehend the material evidence and appreciate the bases of interpretations.This background knowledge is briefly covered in the respective volumes to render them independent readings. For those who would rather start with firmer footings or for those who would like to explore the relevant topic somewhat further, an extensive Bibliography has been attached to each volume.

Given the extraordinary discoveries of human fossils in Africa, the fascinating finds of cave art in Central India, superb specimens of stone tools in Western Europe, and the antiquity of agriculture in the Fertile Crescent, one may wonder, why study the Stone Age record of Pakistan at all? The simple answer is that Pakistan has its own remarkable finds, and it has an archaeological record that rivals in richness those in better known regions of the world. The more complicated and important reply, however, is that Pakistan has a distinctive early archaeological record that challenges many of the models and theoretical frameworks that have emerged on the basis of findings made in other regions. It provides the opportunity to reevaluate, refine and in some cases revise a number of major conclusions concerning our evolutionary history, including the evolution of man; the emergence of modern human behavior; the beginning of sedentism and agriculture; the emergence of social complexity and urbanization; and constantly confronting the problem of incursions by barbarian argopastoral intrusions, which kept this land politically out of balance throughout its history but at the same time benefited it with new blood, new ideas, new socio-economic systems, new religious thoughts, and much more.

Pakistan is of course not just of interest to archaeologists. It is a land of incredible cultural, linguistic, ethnic, and genetic diversity, and its contemporary populations have constituted the focus of a wide range of disciplines, including anthropology, linguistics, history, and population genetics. In these disciplines too, Pakistan has much to offer in terms of general theoretical models and frameworks. Indeed a number of noteworthy studies in the ancient past of Pakistan has been undertaken in the past fifty years or so, taking advantage of the progress made in the disciplines of geology, archaeology, anthropology, linguistics, population genetics, ethnography, biological sciences, sociology, and the like. All of these research areas, however, suffer from two key problems. One is their isolation and lack of engagement with other disciplines investigating this geographical area. The other is the almost universal convention of studying Pakistan as a part of “India”.

In fact, the world known to the inhabitants of ancient Pakistan was the world more to its West than to its East.

This volume constitutes a bold attempt to bring together a variety of these disciplines in the study of Pakistan’s ancient past and to study this region in its own right, not as a part of some hypothetical “India”, nor a part of some nebulous “Central Asia”. This is, of course, a huge undertaking and no one person, no matter how great his or her capabilities, can be expected to do it a justice. Thus, *Ancient Pakistan* can only be viewed as the beginnings of what is hoped will be followed by other more scholarly treatment of the subject.

The term ‘Pakistan’ is a political designation, meant to describe an area containing the modern nationalities of Punjabis, Sindhis, Baluchis, Pashtuns, Kashmiries, Makranis, Muhajirs, Hazaras, and a whole number more. Pakistan is a large landmass, measuring almost a million square kilometers in extent and is the second largest of the seven countries that make up the South Asian region, India being the largest. It is the sixth most populous country in the world. The size of the landmass in itself suggests that there is much to be gained from examining the history of human geography, including

population dispersals, cultural interactions of various ages, and deciphering the overall trajectory of human evolution in this unique region.

Pakistan presently contains nearly 180 million inhabitants. The people in this landmass speak at least 25 different languages although almost all of them belong to one single family of languages, the Indo-Iranian. The linguistic diversity of Pakistan is matched by a wide and impressive cultural, tribal, and genetic diversity. For example, here one encounters “African-looking” people (the Makranis) on one hand and distinctly “Mongol-type” population (the Hazaras) on the other. In recent years, geneticists have been particularly enthusiastic about tracing the history of various Pakistani populations, linguistic groups, cultural and regional ‘nationalities’, and anatomically distinguishable endogamous groups, through mapping their genes and making connections with other world populations. These methodologies and results have been published in journals of diverse disciplines and their tempo seems to be increasing in recent years. The reader will find references to these research works as we proceed with our account in respective volumes.

The *Ancient Pakistan* has been written on historical principles, beginning with the discovery of stone tools of the early hominids in the Pothwar Plateau two million years ago and culminating at the end of the Harappan Civilization some 1500 BC. It is not a linear story but efforts have been made to make it as streamlined as possible. The principal topics in all volumes are mainly dealt with from the perspective of archaeology, aided by anthropology, along with a sprinkling of geology and population genetics. There are several reasons for approaching the ancient history of Pakistan in this way, the most important of which is that there is a dire need for such a narration and no major exposition of this nature so far exists. Secondly, this kind of narrative allows one to present and discuss a range of opinions on the various subjects that are pertinent to the study of ancient lands.

The approach taken here is also a geographical one. This is something that plays an essential part in understanding the regional character of Pakistan’s cultures throughout the changing times of the past and its fundamental quality of diversity. The character of Pakistan’s changing cultures is as distinct as that of Europe, for example. Like Europe, it comprises a number of cultural and linguistic entities, the composition of which has changed continuously through its long history. One of the distinctive features of Pakistan’s cultural history is the way in which it has encapsulated human communities of diverse nature at many different cultural and technological levels, allowing them, to a large extent, to retain their identity but still making it possible to establish inter-community relationships.

These characteristics have given the peoples of Pakistan in prehistory a peculiar flexibility and adaptability of their own. It is evident from a variety of prehistoric data that in changing circumstances the people had within themselves the means, and the intellectual reserves, to deal with the often catastrophic problems that arose in the unpredictable environment of the region. The history has shown that when one means of survival became impossible there was always another.

The basic premises of this work are three. First, it is a fallacy to portray the Indian subcontinent of antiquity as a single geographical and cultural unit of which ancient Pakistan is supposed to have been a part. Archaeological evidence is overwhelmingly against such a proposition. Even a cursory look at the archaeological data would show that the region that is now known as Pakistan always remained shy of India, namely the area that lies beyond the Great Indian Desert, but has had considerable affinity, both cultural and genetic, with Central Asia. Second, ancient Pakistan, consisting essentially of the Indus plains and the surrounding hills and plateaus, started to develop as a culturally

interrelated region right from the Stone Age. The large bank of stone artifacts, the nature of lithic technologies, and the newly accumulating genetic data, stand witness to this proposition. This was, of course, the result of its peculiar geography, which provided it with a wall of mountains to its west to separate it from Central Asia, and a formidable desert, the Thar, to its east to separate it from the rest of the Indian subcontinent. Third, ancient Pakistan did not exist in isolation; from the very beginning, it was either a part of the known world or its past can be better understood in context with the prehistory of the known world. This world is by no means confined to "India" or the Indian subcontinent in general but extends long distances to the West. In fact, the world known to the inhabitants of ancient Pakistan was the world more to its west than to its East.

Starting from these working hypotheses, I have attempted to indicate the nature and succession of various cultures, which determined the early development pattern of this land. The evidence is generally archaeological in nature, but, as stated earlier, other disciplines, such as population genetics, linguistics, geology, anthropology, etc., also play their respective role. The geographic area discussed comprises the region within the approximate boundaries of the present-day Pakistan – from the Indo-Gangetic Divide to the Khyber Pass, from the foothills of the Himalayas to the coast of Makran, from the current Indo-Iranian borders to the Runn of Kutch, from the Gomal Pass to the dry bed of the Ghaggar-Hakra River at the edge of Cholistan, and from the rugged hills and valleys of Baluchistan to the vast desert of the Thar. The area between the Ravi and the Sutlej/Beas, although not within the current boundaries of Pakistan, is included as, geographically, it lies within the Valley of the Indus and has therefore been a part and parcel of the Indus cultures in the past. Similarly, a sliver of coastal land in Kutch, essentially the Indus delta, is also included although current political boundaries exclude it.

The superficial observer would sneer that India has had some episodes but no history, and ancient Pakistan and Central Asia had neither episodes nor history. This skepticism is used to justify lack of study and an absence of interest in the ancient past of Pakistan on the part of scholars. It is also used to justify the relegation of this land to a status of the Indian hinterland unless forced by overwhelming archaeological evidence to mention it separately as "northwestern India". It is further used by the intelligentsia of Pakistan to justify the beginning of Pakistan's history with the invasion of Muhammad Bin Qasim, or those of Ghouri, Ghaznavi, and the like at best and with the inception of the Muslim League at worst.

The considerations that follow will show that the absence of episodes does not necessarily negate the existence of history. Judged by the standard of time, this region was thickly populated from the very early times of human existence and these human beings have left a heavy trail of footprints on the sands of time. All we have to do is to reconstruct a history without episodes, which means that it cannot be the same type of history as we are generally familiar with through our school textbooks. The present series of books is a small step in that direction.

Essentially, this work is a narration of the story of the Indus man in his remote past, his struggle for survival, his ingenuity, his accomplishments, his failures, and his capacity to endure. At the end, it is an attempt to dislodge the student of history from the traditional timeline of Pakistan's history and focus his or her attention on its very beginning. It is hoped that this effort will help the reader in thinking about Pakistan as a land of antiquity instead of looking at it only in terms of Muhammad Ali Jinnah, the Muslim League, the Partition of British India, or the playground of various military and civil despots since then.

I have tried to rearrange the available archaeological data in such a way that a comprehensible story of Pakistan's ancient past could be told in context of Central Asia as well as that of the subcontinent. In doing so, if I have been able to wean the reader away from a purely Indo-centric point of view of history and redirect his or her attention to the area of Baluchistan, Sind, Punjab, and the Pashtun country itself and do so with reference to Central Asia and Iran with which this land has had a long-standing historical and cultural relationship, I must consider this whole effort worthwhile.

This is, obviously, a radical change in perception and dissenting voices will definitely be heard. Since it is an unconventional approach and since this point of view is being advocated here with some vigor and enthusiasm, it is inevitable that a great deal of technical detail had to be included. By the same token, if the reader detects a sort of missionary zeal in the book, it is inevitable, in fact necessary; it is the very *raison d'etre* of the present work.

At the end, it is hoped that this effort will help the reader in thinking about Pakistan as a land of antiquity instead of looking at it only in terms of Mohammad Ali Jinnah, the Muslim League, the Partition of British India, or the playground of various military and civil despots since then.

One needs patience and a degree of perseverance for reading books on prehistory, archaeology, and anthropology (and now, on archeogenetics) in spite of the initial aura of romance associated with the subject. However, the reader who sticks to the task may find gratification and great satisfaction in sensing, as the author does, the heroic struggle of man to survive, his endless adaptation to the changing environment, and his compulsion or genius for material progress. The story of the early man who inhabited ancient Pakistan is particularly interesting; the presence of human ancestors in the northern Pakistan some two million years ago, their continued adaptation to the radically changing environment, their technological dexterity, as shown in the fashioning of their intricate stone tools, and their

artistic abilities as are apparent from the exquisite paintings on pottery, is an intriguing story in itself.

Theextraordinary contribution of the Indus people to the development of agriculture and animal husbandry in the foothills of Baluchistan has not yet been told fully but it has recently started to come to light, albeit grudgingly and albeit hesitantly. The remarkable acumen for city and town planning of the Harappans speaks volumes about their vibrant culture; their spirit of venture on the high seas still resonate in the word *Mallah* (the Sailor) which is evidently a derivative of the *Meluhha* by which the Mesopotamians knew the Indus people in the third millennium BC; their composition of religious hymns (the *RgVeda*) is undoubtedly the first; and their contribution to the development of Sanskrit and its vast literature is legendary. All this must make an interesting story.

The idea for undertaking this project principally stems from that towering archaeologist of India and Pakistan, Sir Mortimer Wheeler (*Five Thousand Years of Pakistan*, *Indus Civilization*, among others). Additional inspiration comes from Aitzaz Ahsan's *The Indus Saga*, which in effect is a halfhearted appeal for looking at the history of Pakistan in its own right rather than as an appendix to the history of "India". The process of gathering together material, planning and writing this book imitate Yahya Amjad's book *Tareekh-e-Pakistan - Kadeem Daur.*

This book has not been written for fellow historians; its audience is the inquisitive student of history who is interested in looking into Pakistan's ancient past in some detail. The book is also intended for the general reader with an interest in the cultural history of Pakistan, and how it came to be as it did. It

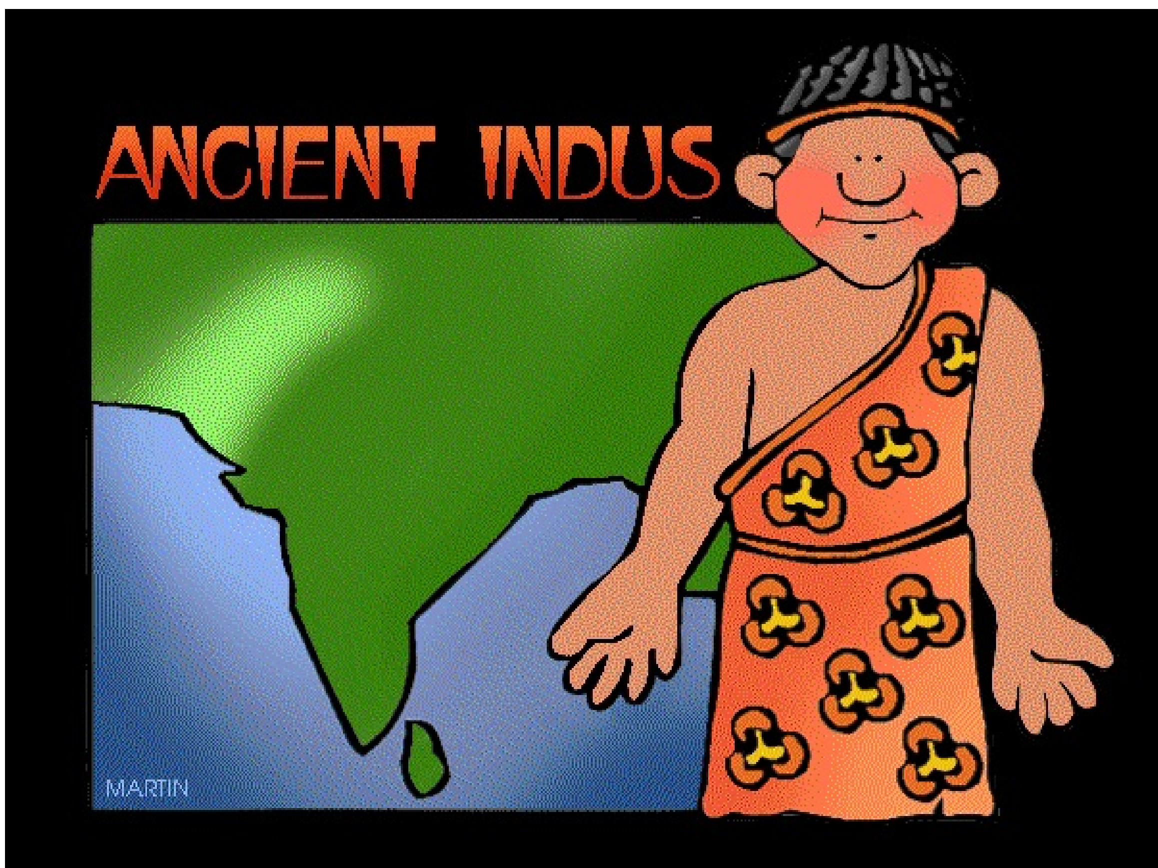
may also perhaps be useful to the student embarking on the study of South Asian archaeology or ancient history of this region. It is emphatically not a compilation or compendium of available information; nor does it claim to be comprehensive at the level of theory or ideas within the fields it touches. What I have tried to do is to tell as coherent a story as is possible at the present time, of the development of human life and culture within the region that lies between the Hindu Kush Mountains and the Thar desert, indicating the main trends, principal motivating factors and important turning-points, as we see them on the long road from the earliest toolmakers, over two million years ago, to Early Historic times in the early centuries B.C.

I am aware that what is known today about the remote past of this land is so tentative and fragmentary that it can be critiqued for not managing the subject in a way that comes to approaching completeness or definitiveness. This is, obviously not possible at this stage or anytime soon. Future research will definitely add more details to the subject and the interpretative approaches will surely keep on changing.

Finally, and most importantly, it must be stated and explicitly acknowledged that *Ancient Pakistan* is a synthesis of a large number of excellent writings by world-renowned archaeologists, prehistorians and scholars of related disciplines around the world. Since it is a synthesis, no originality is claimed. My job has been nothing more than putting in order the available information widely spread out in various books and monographs as well as original archaeological reports and research papers. Some of these writings have been extensively reproduced here without putting them in quotation marks, generally giving specific reference to their origins but sometimes, inadvertently, of course) without. However, most of these sources have been listed in the references at the end of each chapter or section. The same applies to various figures, photographs, drawings, and sketches. My gratitude to all these researchers and scholars is, of course, due and I am deeply indebted to all of these authors and publishers.

M.Ahmed

Preface



This volume forms the third installment of *Ancient Pakistan*
- *An Archaeological History*

and continues the story of the land from the point reached in the second volume, *A Prelude*

to Civilization , which ended with the development and spread of village farming communities all over the country by the middle of the fourth millennium BC. and left the Indus man at a level of cultural and technological development from which he could now take a great leap forward to a large-scale urban civilization in the alluvial plains of the Indus and its tributaries, roughly encompassing the area that now delineates Pakistan and then some. While the volume II traces the creative activities of the Indus peoples mainly in Baluchistan, the focus in the present volume shifts to Sindh and Punjab but still reaching as far as the Indo-Iranian borders on one hand and the borders of Tajikistan on the other. Baluchistan still remains in picture but it plays a somewhat subsidiary role. Furthermore, while the previous volume dealt with the formative age of the Indus Civilization, the dominant theme here is provided by the blooming of what some archaeologists call the Indus Civilization or Mature Harappan Civilization. Chronologically, this volume covers a time period between 3,000 and 1,500 BC, more particularly between 2500 and 1700 BC.

The discovery of the Indus Civilization is said to be a purely incidental event in the history of South Asian archaeology. There was no hint in historical literature of the region that a prehistorical era had predated the Mauryan Empire of the third century BC. In fact, prior to the 1924 publication of the article announcing the excavations at Mohenjodaro, the earliest secure date in ancient history of the subcontinent was the spring of 326 BC which marked the Alexander’s raid on the Indus Valley.

There is still no useful historical record to provide scholars with significant insights into those aspects of Harappan life that are difficult to elucidate from the archaeological record. The lack of a true historical record does not, however, mean that interesting and important insights into the Harappan Civilization are beyond the historian's grasp. There is a formidable record of archaeological work on this Civilization, and this information can be eminently used for reconstructing the historical milieu of the time. There is a wealth of interpretative writings which make the study of the subject quite interesting. There has been a dearth of theoretical work till a few decades ago and this gap has recently invited a rush of contributions by scholars the world over. Given this record, it is naturally difficult, if not impossible, to fully review this important part of Pakistan's past. An attempt has, nevertheless, been made here to review the earliest cities of the Greater Indus Valley, and perhaps its first state. This volume is, in essence, the tale of a pre-historic urban culture of the Indus Valley in its full bloom. Here we are concerned more with the material culture of the Harappan Civilization, deferring the theoretical aspects to the next volume (Vol. IV. *Theoretical and the Abstract*).

Geographically, the story of the Harappan Civilization is the story of the Greater Indus Valley. This region is the easternmost portion of a large geographical and cultural area of antiquity, stretching from the Mediterranean Sea to the Thar Desert and from the Persian Gulf to the plains of Central Asia. While an integral part of this large interaction zone, the Indus Valley was a geographic and cultural unit in itself. On the east it was defined by the Great Indian Desert, the Thar, which separates it from the peninsular India; on the west it was delineated by a series of mountain ranges, mainly the Sulaiman but extending into the present day Afghanistan and crossing the Hindu Kush mountains to as far as the Oxus River; in the southwest it was bound by vast tracks of deserts which separated it from Iran; in the southeast it covered the Indus Delta, which included Kutch; to the south, of course, lied the Arabian sea; and to the north its borders were the great Himalayas. These are more or less the same boundaries that more-or-less define modern Pakistan.

The Harappan Civilization was the product of an intriguing period of historical developments in the Indus Valley and was distinctive among the great river valley civilizations of the third millennium Bronze Age. It was a time of developed social classes, craft and career specialties, writing, and long-distance trade with northern Iran and Central Asia, as well as maritime contacts with the peoples of the Persian Gulf. It was also a time of cities. The great Harappan cities may not have been as large as the contemporary cities on the Euphrates, but some of them were built with the finest quality baked brick and with great skill in masonry; they were often laid to a plan; and they had street drainage systems which few other third millennium urban civilizations had.

The remains of the Harappan Civilization include cities and villages, craft centers, river stations, camp sites, fortified places, trading posts, and ports, spread over an immense geographical area. The sites are found in Sindh, Makran, northern Baluchistan, Punjab, and Cholistan in Pakistan; a few sites also dot East Punjab, Haryana, Rajasthan, and Gujarat in India along the Indo-Pakistan borders. To the west, we find a few sites as far as Badakhshan in northern Afghanistan, and Sutkagendor in Baluchistan right at the Iran-Pakistan borders. Flourishing between 2600 and 1900 BC, the Harappan Civilization had an impressive geographic spread in contrast to the Mesopotamian, Egyptian and recently emerging Central Asian Bronze Age civilizations. In material terms, this period is recognizable by its north-south aligned settlements, typically preplanned, quite often segmented into two or more parts, and often surrounded by town walls. Other material signatures involved frequent architectural use of mud brick platforms on which residential houses and public buildings were built; fastidious, almost fanatical, attention to water supply and drainage, including a plethora of street

drains, wells, sump pits, baths, bathrooms; consistent binary system of weights and measures; distinctive animal and human figurine assemblage; unique style pottery in terms of manufacturing technique, decoration, shape, and style; virtually a complete lack of any military-related materials, both in terms of weapons and fortifications; and a rich collection of lapidary objects, most importantly the stone beads.

While the account of this journey towards urbanization is covered in the *Prelude to Civilization*, the present volume recounts what was the destination of this journey in full summer of its bloom.

The reader is reminded that in the *Prelude to Civilization* the natural boundaries of ancient Pakistan gradually emerged as we passed through the agricultural settlements in Baluchistan, Sindh, Punjab, and the Pashtun Country. The common ethos of the land, that became fully manifest in the third millennium BC during the Mature Harappan times, also emerged naturally as we traversed in time from the early settlements in Baluchistan to the developed village farming communities in Baluchistan and Sindh, and then to four or five regional cultures that thrived in the length and breadth of the Indus Valley for several centuries before they started to show acute cultural affinity for each other and eventually merged into a single urban society of common values and tastes. This journey in time may not have been unidirectional and it was certainly not short, but its direction to a cultural integration of the whole Indus Valley into one single culture is unmistakably discernible. While the account of this journey towards urbanization is covered in the *Prelude to Civilization*, this volume recounts what was the destination of this journey in full summer of its bloom.

In the literature of archaeology the remains of the Harappan cities and urban centers are often spoken of as “Mature Indus” or “Mature Harappan”. This term refers to the period when the urban centers of the civilization flourished and the crafts and trade were in full swing. It is distinct from both the formative period (termed the ’Early Harappan and dealt with in detail in Volume II: *A Prelude to Civilization*), and the period after the abandonment of the cities and the withering away most of the vestiges of civilization (the ’post-Harappan’ period).These terms are important to be kept in mind in any serious discussion of the Indus Civilization.

In this book, we shall use the *Harappan Civilization* to designate the *urban* period of the Indus culture, as the convention has so far dictated. Occasionally the reader might find reference to the *Indus Civilization*; this term has been used here synonymously with the Harappan Civilization, as most of the prominent archaeologists, ranging from Sir John Marshall to Sir Mortimer Wheeler, have unreservedly used to describe this period of Pakistan’s ancient past. Occasionally, the terms *Mature Indus* and *Mature Harappan* have been used but this has been done only on those occasions where a confusion was likely to arise and this possibility needed to be forestalled. All these terms denote a period of Pakistan’s prehistory when essentially rural agricultural villages and hunting-gathering societies gave way to a social system in which cities and towns played a key economic role, a recognizable social stratification existed, various parts of the Greater Indus Valley integrated into a homogenized technological area, trade within the Indus region as well as with the peripheries flourished, and an elite class developed which apparently used a unique type of script to communicate among themselves.

In style and framework, this volume seeks to maintain uniformity with the preceding volumes, with the same level of photographic illustrations, drawings, and maps. Just like the previous volumes, the present volume is descriptive as well as interpretive: theoretical topics have not been avoided but they

are dealt with in brief. They find their rightful place in the next volume.

M. Ahmed

Chapter 1

Introduction



Around five thousand years ago, between 2600 and 1900 BC, a truly expansive civilization developed on the Indus floodplains. A large number of settlements arose, which were, in varying degrees, urban in characteristics, flanked by a still larger number that were 'rural' in their economy and culture. These settlements covered a remarkably large

area, almost 1 million sq. kilometers of land which is today centered around modern-day Pakistan. This was not an isolated cultural event; the emergence of this civilization, commonly known as the Indus Civilization or, more recently, the Harappan Civilization, was linked to a number of regional cultures that existed in the Greater Indus Valley prior to 2,600 BC.

The emergence of the Harappan Civilization in the Greater Indus Valley was not an isolated event in another aspect: such cultural developments were also happening, to varying degree, in Iran and Central Asia. All these civilizations, while interconnected with each other, were also in contact with that of Mesopotamia, where an urban culture had developed a little earlier. Thus, we are dealing here with a civilization that was an integral part of a cultural interaction zone that spanned from the Euphrates in the West to Oxus in the northeast, and to the Sutlej in the East. These pockets of civilizations are collectively called the Bronze Age civilizations, the Harappan Civilization being the most expansive. In order to put any of these civilizations in perspective, therefore, we must have some idea of the Bronze Age in general, and that is why we begin this book with an overview of the Bronze Age Civilizations.

The Indus Civilization peaked around 2500 BC in the Indus Valley, declined during the early 2nd millennium - around 1900 BC - and was forgotten until its rediscovery in the 1920s by Sir John Marshall and his Indian colleagues. At its peak, this civilization may have had a population of well

over five million. While a civilization of cities, towns, and villages was developing, a considerable proportion of the Indus inhabitants continued their life as hunters and gatherers. Their camps, however, did not leave any archaeological remains.
The discovery of the two most important ancient cities of the Harappan Civilization Mohenjodaro and Harappa - was an exercise in pure archaeological discovery (1,2). There was no hint in the historical literature of the Indian subcontinent that an historical era had predated the Mauryan Empire of the third century BC. In fact, prior to the 1924 publication of the article by Marshall announcing the excavations at Mohenjo-daro the earliest secure date in ancient South Asian history was the spring of 326 BC in connection with the Alexander the Great's raid into Pakistan's northwestern region.

There is still no useful historical record to provide archaeologists with significant insights into those aspects of Indus life and history that are difficult to elucidate from the archaeological record. We do not know what these peoples called themselves or their cities, towns, and villages. We have no king lists like those in Mesopotamia, no internal chronology, no historical sense of the provinces and districts of the civilization. There is no historical record of commerce, production, consumption, or technological skills and processes. And what is perhaps most important, there is no historical record of the internal social organization of these peoples - their lineages, clans, sodalities, or guilds. We have from history alone no sense of the role of the state as opposed to the religious institutions in the operation of Harappan life - a theme central to understanding the historical dynamics of the other ancient civilizations of Asia.

The lack of a true historical record does not mean, however, that interesting and important insights into the Harappan Civilization are beyond the archaeologist's grasp. Indeed, if we judge by the amount of excavation, study, and writing on this topic, much of new insight in the lives of the inhabitants of this civilization is being gained. There is indeed a formidable record of archaeological work on the Indus Civilization. Basic surveys of the Indus Civilization are available in a number of sound sources; some of them are listed in the Bibliography at the end of this volume. The older books by Wheeler (3,4,5) and Piggott (6) are still useful sources on selected topics. A number of good bibliographies on the topic are also available (7,8,9). There is, of course, a wealth of information a click away on the Internet. This wealth of data makes it impossible to fully review Pakistan's earliest cities, and perhaps its first state. Only a general review is possible and that is precisely attempted in this volume. This volume deals with the material culture of the Harappan Civilization, leaving the theoretical discussions and abstract considerations to the next volume (23). This chapter should be taken as an introduction to the rest of the book.

What is in the Name? This volume of the *Ancient Pakistan - An Archaeological History* deals with the Urban Phase of a cultural tradition, spanning from the early food producing societies in Baluchistan ca. 7000 BC to its decay and demise ca. 2000 BC, often called the I*ndus Cultural Tradition*. In another aspect, it represents a small section of a long period of the cultural history of the Greater Indus Valley - called by Possehl the *Indus Age*. This section of a long cultural tradition or this part of the particular cultural age is generally known in archaeological circles as the *Harappan Civilization*, after the town of Harappa (in Punjab) where the remains of this culture were first discovered. Some archaeologists and anthropologists would prefer to call it the *Mature Harappan*, flanked on each side by the *Early Harappan* and *Late-Harappan*, respectively. Earlier archaeologists, such as Marshall, Wheeler, Piggott, and Mackay, simply named it the *Indus Civilization* or I*ndus Valley Civilization* and this name stuck. The newest fashion, especially in India, is to call it the *Indus-Sarasvati Civilization*. All these names mean the same entity, i.e. the urban phase of the *Indus Valley*

Tradition or, in Possehl's words, the *Indus Age*, but carry different implications, some innocent, some heavily loaded with ideology and political agenda. Of course, each one of these terminologies have been provided with a convincing explanation as to why one should prefer one term over the others.

The term 'Indus Valley Tradition' or the Indus Age should not be confused with the Harappan Civilization, the Indus Civilization, or the Indus Valley Civilization. The Indus Age or the Indus Valley Tradition is used for the long series of human adaptations starting from the neolithic-chalcolithic stage (24) to the decline of the Harappan Civilization (25). Within this larger sequence, Shaffer, and later Kenoyer and others, used the term '*regionalization era*' for the Early Harappan phase, '*integration era*' for the Mature Harappan phase, and '*localization er*a' for the Late Harappan phase. The *Harappan Civilization*, the *Indus Civilization*, or the *Indus Valley Civilization*, corresponds with the Mature Harappan phase or the Integration Era of the Indus Valley Tradition. Simply stated, it is the Urban phase of the Indus Age or the Indus Valley Tradition.

The name *Harappan Civilization* is selfexplanatory. It is a common practice in archaeology to name a particular culture or cultural phase after the site where such a phase or 'culture' was first discovered. It is, thus neutral in its connotation. The identification of this cultural period with the Indus

"The first step in the path of wisdom is to call things by their right names" *Thus (reportedly) spoke the Great Master*

history.

The name Civilization or the Indus Valley Civilization stems from the fact that it centered in the Indus Valley. At that time not much was known about the precedents of this civilization or even the extant of the area which this civilization covered.

Playing on this theme, the cultures that gave birth to this civilization were called the Early Harappan, and those that emerged after its decline were termed as the Late Harappan. This nomenclature served its purpose by linking the urban phase of the Indus Valley with its antecedent cultures and those that came after the decline of the Mature Harappan phase but it also created a lot of other problems. For example, when we speak of the Harappan Civilization, what do we actually mean? Is not the Early Harappan and Late Harappan still Harappan? It mingles together three distinctly differentiated cultural phases into apparently one single entity: the Harappan! This ambiguity in terminology has been variously misused, especially by a whole crop of post-Independence Indian archaeologists and prehistorians who indiscriminately use the name ' H a r a p p a n ' f o r t h e E a r l y Harappan, Mature Harappan, and the Late Harappan sites, scoring a few points with their superiors and the public at large but mutilating the region's

Indus-Sarasvati Civilization is much more insidious. It first assumes that the river braids, which we call Ghaggar in India and Hakra in Pakistan, were in fact the Sarasvati, a Vedic river of roaring proportions. It is then pointed out that a large number of "Harappan" sites were located around this river, thus making the whole Indus Civilization not only centered around the "Sarasvati", but also Vedic. It is unfortunate that a number of lay authors as well as a few professionals in the West have also started using this name, probably for the sake of fashion if not for anything tangible. This

The reader must be clear in his or her mind that the Harappan Civilization represents the Indus urban culture in its full bloom. The reader must

also be clear in his or her mind that all three phases - the Early, Mature, and the Late - are distinct in their material culture and early archaeologists have always kept this obvious distinction in view when describing their finds.

trend is dangerous as there may not be a stop to this process. We should not be surprised if tomorrow someone would like to call the Harappan Civilization a Sindhu-Sarasvati-Gujarati Civilization with a point to do so. Similarly, it would not be surprising, if this trend continues, the Indus may soon be dropped and the name would simply become Sarasvati Civilization. Indeed, this movement has already started. For instance, Chakrabarti (10), a well-known author on the ancient history of India, is preaching the novel idea that the Indus Civilization in fact started on the banks of the "Sarasvati" river and from their it expanded into the Indus plains. To stop this unrestricted process and to avoid the confusion already created we need to go back to the unwritten convention in archaeology, i.e. name the culture after the type-site where it is discovered or identified for the first time, or follow the convention that has been so familiar to the student of prehistory for as long as a century.

These are high sounding words, but it is not clear as to how does this facilitate our understanding of the nature or working of the Indus Civilization. Furthermore, by robbing off a civilization of its beginning or its end, how can we discuss its maturity, or even a discrete existence. We would, therefore, be content here with the simple model of the preurban, urban, and post-urban phases of Pakistan's prehistory. This approach may have certain limitations but it has the advantage of being simple and easy to understand. Since the Early, Mature and Late Harappan have been so commonly used in archaeological literature, we cannot altogether avoid the use of this terminology. In fact, in this book we have mostly followed this convention, as the title of this volume so clearly indicates.

It should, however, be kept in mind that the term Harappan Civilization is used synonymously with the Indus Civilization and Indus Valley Civilization which has a much more wider currency in archaeological literature. The reader should, therefore, not be surprised if both of these terms are found to be in use here as alternative to the Harap pan Civilization. Scholars in Pakistan insist on exclusively using the term Indus Civilization and show a certain degree of distaste for the Harappan Civilization. This is besides the fact that the Indus Civilization is a general term which could mean different things to different people within the broader gambit of the Indus Age. The term Harappan Civilization, on the other hand, denotes a set of broadly defined cultural traits and a strictly defined cultural period in the Greater Indus Valley - an urban interlude between 2600 BC and 1900 BC. For reference's sake, the Table 1 above summarizes the terms that are equivalent to each other.

In recent years the Indus or Harappan Civilization is being looked upon as a discrete segment of a much broader concept of 'Indus Cultural Tradition'. This idea was probably first introduced by Jim Shaffer (26) and was reformulated by Kenoyer in his prolific writings. The idea embraces the manifest cultural continuities of cultures within the grand narrative of the Greater Indus Valley from food producing communities in Baluchistan in the seventh millennium BC (Vol. II. *A Prelude to Civilization*) to its end in the second millennium BC. In this conceptualization the Harappan Civilization is thus merely an urban interlude in this narration. The concept clearly echoes the historiography of the 'Indian Tradition' which has come to dominate the historiography of India. These authors visualize the entire Indus culture as one grand, although constantly changing tradition, the elements of which were either retained and modified, or abandoned because of their nonutility and replaced by new ones. These changes could then be treated as parts of the entire cultural complex. Viewed in this light, the various processes of evolution and devolution of the Indus cultural complex

can be constructed if the sites are not considered isolated, either locally or regionally.

Kenoyer (11) divides the ‘Indus Valley Tradition’ into four Eras listed in Table 1 below. The Early Food Producing Era (*ca*. 7000-5500 BC) is a time when domestic plants and animals are first exploited in the Indus Valley. The Regionalization Era, (*ca*. 5500-2600 BC) corresponds to a period of regional cultural development that is subdivided into

Table 1. General Chronology of the Indus Tradition

1. Early Food Producing Era (Neolithic/Chalcolithic) 6,500 - 5,000 BC
2. Regionalization Era (Early Harappan Phase) 5,000 - 2,600 BC
3. Integration Era (Mature Harappan Phase) 2,600 - 1,900 BC
4. Localization Era (Post-Harappan Phase) 1,900 - 1,000 BC

various Phases defined by specific artifact styles and regional cultural interaction. The next era Kenoyer calls the Integration Era (*ca*. 2600-1900 BC) and is the time generally associated with the term "Indus Valley Civilization", the “Harappan Civilization”, the ‘Urban Phase’ of the Indus Civilization, or the ‘Mature Harappan Period’. This Era is characterized by the emergence of numerous urban centers and smaller regional towns and, as stated earlier, at this time we see the common use of a writing

Possehl’s Periodization of the Indus Age

1. Pre-Urban Phase (7000-2600 BC)
2. Urban Phase (2600-1900 BC; the Harappan Civilization)
3. Post-Urban Phase (1900-1300 BC)

system found primarily on pottery or on inscribed seals and tablets.

The final Era of the Indus Tradition is referred to as the Localization Era (1900-1300 BC). During this time there is evidence for major transformations in the socio-economic and political organization of cities and regional settlements. While there are some important continuities that link this period with earlier cultures, there are nevertheless significant changes in technology and production that are in turn linked to changes in stylistic and symbolic aspects of the material culture. The most significant changes are seen in the disappearance of Indus writing, standardized weights, and the breakdown of long distance trade. In other words, the Harappan Civilization comes to its end and sets the stage for closing a vibrant era in the prehistory of Pakistan. By 1700 BC, the Indus Age starts giving way to the so-called Vedic Age and by 1500 BC it comes to a final end. In this scheme of things, the “Regionalization Era” corresponds with the “Early Harappan Phase”, the “Integration Era” with the “Mature Harappan” or “Urban Phase Phase”, and the “Localization Era” with the Late” or “PostHarappan Phase”.

Some years ago Possehl developed a sysnologies to describe these three distinct cultural periods. However, the use of the term, the Harappan Civilization, persists, often without any qualification whether Early, Mature, or Late.

It is instructive to repeat that the Harappan Civilization (or the Mature Harappan) is different from the *Early Harappan* phase. In the Early Harappan Phase the stirrings of urbanization were faintly visible

in various Indus settlements but none of them could claim the status of a town or a city, nor did they exhibit any sign of their integration to an overall urban economy. The Harappan Civilization is also different from the *Late Harappan* phase when most of the vestiges of city life had already disappeared from the Indus settlements and these sites

Table 2. Some Commonly used terms in Describing the Indus Civilization

Early Harappan = Early Indus = Regionalization era = pre-Urban Phase of the Indus culture Mature Harappan = Harappan Civilization = Integration era = the Urban Phase of the Indus Civilization Late Harappan = post-Harappan = Localization era = the post-Urban Phase of the Indus Civilization

tem of terminology to assist with the organization of the archaeological record of the Indus Civilization (12). This involves the notion of a *Pre-urban Phase*, preceding the widely known *Urban Phase* as exemplified at places like Mohenjo-daro, Harappa, Chanhu-daro, Kalibangan, and Lothal. The Urban Phase is then followed by a *Post-urban Phase*, a term intended to rid the literature of the confusing, often misused notion of a "Late Harappan." This encompasses the period following the principal urban occupations at Mohenjo-daro, Harappa, and the other Urban Phase sites. This scheme of things is much simpler and much more direct as it avoids all confusion in separating different phases of cultural development in the Indus Valley. Although this terminology is slowly creeping into archaeological literature, it is still not common. Because of its usefulness, we shall refer to Pre-Urban, Urban, and Post-Urban phases quite frequently, thereby helping the introduction of this terminology instead of the commonly used terms: the Early, Mature, and Late Harappan.

Table 2 below summarizes this maze of terms and indicates each other's equivalencies. In this volume our focus is on the “Mature Harappan” phase of the Indus Tradition; as indicated in the above Table, “Mature Harappan” corresponds with the “Integration Era” and the “Urban Phase” of the Indus Civilization. This cultural period is more than often simply called the “Harappan Civilization” and, as discussed below, this has lately created a lot of problems.

What Makes a Site Harappan? As is evident from the above discussion, early archaeologists have taken pains to differentiate between the “Early”, “Mature”, and “Late” Harappen. Some have even gone to the extent as to devise different termiwere nothing but a shadow of themselves. The reader must be clear in his or her mind that the *Harappan Civilization* represents the Indus urban culture in its full bloom. The reader must also be be clear in his or her mind that all three phases - the Early, Mature, and the Late - are distinct in their material culture and early archaeologists have always kept this obvious distinction in view when describing their finds. Harappa and Mohenjo-daro produced the basic cultural markers by which other settlements subsequently found could be identified as belonging to the ‘Harappan’ or the 'Indus' civilization. These defining markers can be listed as follows:

1. Wheel-made pottery of a distinctive kind: baked to a red color, thick-walled, heavy, sometimes coated with red slip. Some pots were painted black; and there were certain popular motifs painted in black on the pottery, such as the pipal leaf, intersecting circles and the peacock.
2. The Indus script, especially appearing on seals, with characters that show little or no regional variations.
3. Baked bricks, as well as sun-dried mud-bricks of standard size, with sides roughly in the ratio of 1:2:4.
4. Standard weights, based apparently on a binary as well as fractional system.

5. A tendency to layout straight roads (meeting others at approximately right angles) in urban and semi-urban settlements, and to pay considerable attention to drainage.
6. ‘Citadels’, or upper towns, built adjacent to, but separate from the main residential areas.
7. Masonry wells and tanks.
8. Burying the dead, laid supine, aligned northsouth, usually in out-of-town cemeteries.

Naturally, all these features are not to be expected at every settlement, especially those that were small or which have not seen any excavation. Pottery and bricks are perhaps the most easily noticeable markers. One important point has been mentioned very frequently in this connection: the lack of great changes in the life of the Indus cities, right from their birth up to their abandonment. The pottery, the tool types, and the seals remained nearly the same. The writing also was static; this is in strong contrast to the region in the historical period, when the form of the letters varied so much from one century to the next that the script offers a fairly good method - sometimes the only known method - of dating manuscripts or inscriptions.

The urban period of the Indus Age, that is, the Harappan Civilization, generally falls between 2,600 BC and 1,900 BC, with some exceptions here and there. Before 2,600 we do not see a coherent urban culture anywhere although a few elements may be hazily visible at some selected sites in their blurred outlines. Similarly, a survey of the Harappan sites would reveal that most of the manifestations of urban life vanished from the Indus sites that survived a period of general abandonment ca.1900 BC. Thus, chronology is another tool that provides

A stray Indus find does not make the site Harappan. These finds may indicate that the site had contacts with the Harappans but does not prove that it was an Harappan site itself. To make the site Harappan, one must connect several cultural dots and see if the general character of the site appears to be Harappan as a whole; is there a sign of urban living?, is there any inkling of writing?, do we find there typical Harappan seals?, what is the materials of construction used in the architecture?, do we observe a slew of typical Indus artifacts or are we basing our analysis only on a stray find?, etc.

us with some bearing on the stage of cultural development through which a given site must be passing through and this factor can be weighed in answering the question posed.

Finally, and most importantly, the typology of artifacts found at any site is generally a good indication for its characterization. A stray Indus find does not make the site Harappan. These finds may indicate that the site had contacts with the Harappans but does not prove that it was an Harappan site itself. To make the site Harappan, one must connect several cultural dots and see if the general character of the site appears to be Harappan as a whole; is there a sign of urban living?, is there any inkling of writing?, do we find there typical Harappan seals?, what is the materials of construction used in the architecture?, do we observe a slew of typical Indus artifacts or are we basing our analysis only on a stray find?, etc.

The publications cited for “Harappan discoveries” are spread over almost half a century, and definitions have changed during this time. Thus, what one excavator calls Harappan must not be what another excavator calls Harappan. Even the criteria for the Harappan sites agreed upon by the excavators have not been adhered to, notwithstanding the pious claims to the contrary. Bara sites (in India) have been included in Late Harappan because of the available carbon dates. Sothi-Siswal sites (in Indo-Gangetic Divide) have been included in the Early Harappan as well as Harappan sites. Post-

Harappan sites of diverse cultures have been routinely listed under 'Harappan' sites. Naturally, this has created a lot of confusion in the study of archaeological data pertaining to the Harappan Civilization. Indian archaeologists, although not all, are more prone to these practices. There are several sites in Gujarat, in fact scores of them, which have been described by archaeologist like Rao, Joshi and Bisht as "Harappan" or "Indus" but which have in fact no relation to the Harappan Civilization, that is, the Mature Harappan Period of the Indus Civilization. Most of them are Late Harappan or even post-Harappan. Similarly, hundreds of "Indus" or "Harappan" sites have been located by other Indian archaeologists, such as B.B.Lal, and their underlings in the Ghaggar-Hakra basin deep in the IndoGangetic Divide or even in western Uttar Pradesh in the East, the sole qualification of which to be "Indus" is the find of some stray Harappan artifacts at the site. Most of this sloppy work has been the result of a lack of proper training on the part of the investigators but some of it have been deliberate attempts to further an ultra-nationalistic agenda. A few American scholars are also guilty of this uncritical use of the terms but they could probably be excused as their primary data come from the same archaeologists of sort who have created this confusion in the first place.

The archaeological work undertaken in India could have shed a useful light on the eastward expansion of the Harappan Civilization, its settlement pattern, and its adaptation with changing environments but a blatant disregard of data, a lack of precision in reporting, an almost casual talk about the characterization of sites, and the absence of peer reviews or the field checks have rendered, of course with some exceptions, the whole work in Saurastra, Kutch, and the Divide almost worthless, even misleading. Such casual handling of a serious archaeological work pertaining to a momentous time of human history in the subcontinent and putting the collected data in the service of 'nation building' or for 'claiming the past' is highly regrettable; in fact a low point in the indigenous scholarship, surpassed only by a plethora of recent writings on the 'Harappan Aryans", this time on textural grounds.

Indus Chronology: As discussed above, the Harappan Civilization is the urban phase of a much longer cultural process that began with the development of agriculture and sedentary living in Baluchistan ca. 10,000 years ago and ended with the demise of the high urban culture ca. 1,900 BC. It is instructive, in fact imperative, to look at the Harappan Civilizationn in context with the cultures preceding it and of those following it, thereby placing the Harappan Civilization on the bigger canvass of the *Indus Valley Tradition*, a term that has acquired some popular currency among some North American archaeologists, especially with Shaffer, Kenoyer and Kennedy to include "all human adapta

Table 3. Chronology for the Indus Age

Early Farming Settlements Kili uGl Muhammad Basked-Marked Phase

Developed Agricultural Villages Togau Phase
Kechi Beg Phase

Hakra Ware Phase
Early Indus Period
Amri-Nal Phase
Kot Diji Phase
Quetta Ware Phase

Kulli Phase
Harappan Period
Post-Harappan Period
!!
7,000 - 5,000 BC 5,000 - 4,300 BC have something called a beginning and an end is a debatable concept. We shall be referring to this table frequently as we proceed. Table 3 is another way of grasping the general chronology of the Indus
Age.
Coming to the chronology of the Mature
Harappan period itself, it is based on radiocarbon
dates, confirmed by good cross-ties to the early
history of Mesopotamia. Undoubted Indus artifacts
(e.g. stamp seals, etched carnelian beads, pottery)
have been found in Mesopotamia, and at Susa in
south-western Iran. Those who read the Mesopotamian texts have deduced that the Mesopotamian place-name 'Meluhha' was their designation for the
Indus Valley. There is also a Mesopotamian cylinder seal that once belonged to an Akkadian person who was a translator of the Meluhhan language. Radiocarbon dates and cross-ties allow archaeologists to date the Indus Civilization to ca.
2500–1900 BC. The threshold of civilization comes
in what they call the 'Early Harappan' dating to ca.

4,300 - 3,800 BC
3,800 - 3,200 BC
3,800 - 3,200 BC

3,200 - 2,800 BC
3,200 - 2,600 BC
3,200 - 2,600 BC
3,000 - 2,000 BC
2,600 - 1,700 BC
1,700 - 1,000 BC !

tions in the Greater Indus Valley region from around 6500 BC until 1500 BC".

Possehl (13) coined a more appropriate term, the *Indus Age,* to define more or less the same prehistoric period of ancient Pakistan, more specifically that between the rise of mature agricultural villages in the fifth millennium BC and the dawning of the Iron Age between 500 and 1000 BC. Both of these terms allow a much wider frame of reference for the spatial and temporal patterns of site formation within the regions of the Greater Indus Valley. Both terms are appropriate but the *Indus Age* seems to be preferable as it puts a really long period of time into an organic whole which can then be studied with a sharp focus on its individual components.

Table 3 presents a general chronology of the Indus Age This chronological scheme is basically linear, with pattern of change presented as though they took place simultaneously over vast areas of Pakistan.This is almost certainly not the historical reality of the time. For example, it is unlikely that the transition from the Stone Age or from Huntergatherers to food producers or even from the Early

Harappan to the Mature Harappan began at the same time in all regions of the area. Archaeologists do not really know when, for instance, the Kechi Beg Phase or the one called the Tagau Phase began. Even the notion that the stages and phases

The archaeological work undertaken in post-Independence India could have shed a useful light on the eastward expansion of the Harappan Civilization, its settlement pattern, and its adaptation with changing environments but a blatant disregard of the data, a severe lack of precision in reporting, an almost casual talk about the characterization of sites, and the absence of peer reviews or the field checks have rendered the whole work in Saurastra, Kutch, and the Divide almost worthless, even misleading. Such casual handling of a serious archaeological work pertaining to a momentous time of human history in the subcontinent and putting the collected data in the service of 'nation building' or for 'claiming the past' has been a really low point in the indigenous scholarship, surpassed only by a plethora of recent writings on the 'Harappan Aryans", this time on textural grounds.

Table 4. The Indus Civilization in a Larger Chronological Context
Before 7000 BC: Development of postglacial hunter-gatherer communities. Mesolithic.Beginning of sedentism, arable farming, and animal husbandry in parts of the Near East and their gradual spread into adjacent regions.

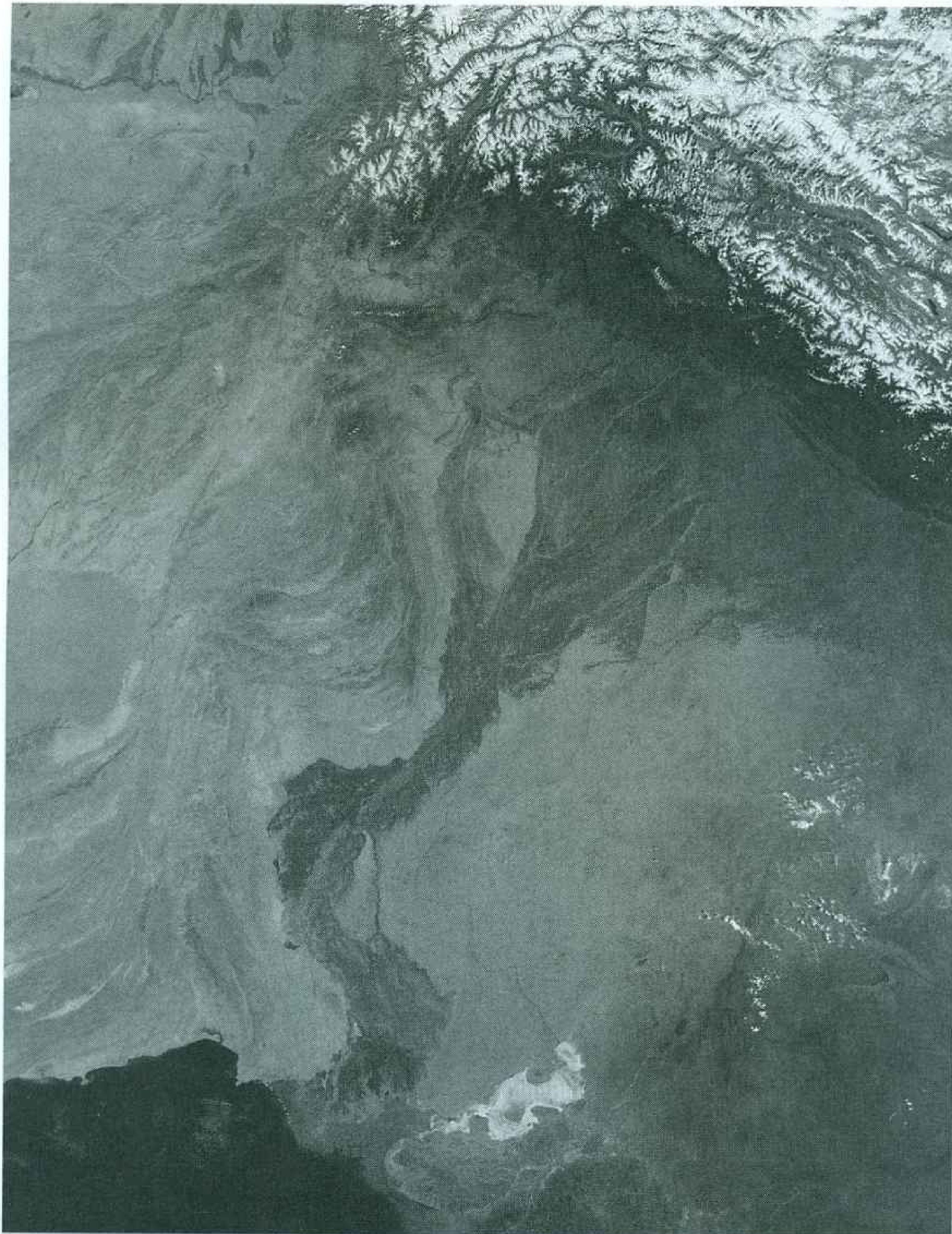
7000 - 6000 BC: Aceramic Neolithic (Possehl's Kili Ghul Mohammad phase). Farming community established at Mehrgarh (pe riod I). Near East: beginning of pottery making and metallurgy; Turkmenia: farming communities by 6000.
6000 - 5000 BC: Aceramic and Ceramic Neolithic (Possehl's Kili Ghul Mohammad phase) Granaries constructed at Mehrgarh; trade links as far as Turkmenia. Beginning of potter making at Mehrgarh (Mehrgarh II). Possibly additional farming settlements in Baluchistan such as Kili Ghul Mohammad. Farming communities in Iranian plateau and Turkmenia.
5000 - 4300 BC: Neolithic. (Possehl's Burj Basket-marked phase). Farming settlements in Baluchistan; pottery; small-scale irrigation; copper smelting. Hunter-gatherers of lowlands acquiring domestic animals
4300 - 3800 BC: Chalcolithic (Possehl's Togau phase). Many farming settlements in Baluchistan; wheel-turned pottery; glazed steatite; copper casting; some immigrants to the Indus plains from Baluch highland.
3800 - 3200 BC: Chalcolithic. Kechi Beg (Baluchistan). Hakra (Ghaggar-Hakra plains). Ravi (3300-2800). Increasing number of farming settlements in Baluchistan, some large; pastoralist camps established in the plains, especially Cholistan; Harappa founded; local hunter-fisher gatherer communities keeping some domestic animals and making pottery (3300-2800).
3200 - 2600 BC: Early Harappan: Amri-Nal (Sindh, S. Baluchistan); Kot Diji (Punjab, N.Baluchistan); Damb Sadaat (Baluchis tan); Indus culture diffuses into Baluchistan: bunds and other irregation works costructed. Spread of farming com munities into Gujarat and the Indo-Gangetic divide; walls and flood defenses; Dholavira and Rakhigarhi founded. Some towns including Harappa, Mehrgarh, and Rehman Dheri; uninscribed stamp seals; protoscript at Harappa; some specialization. Hunter-Gatherers and pastoral communities in northern Gujarat.Mesopotamia: city-states emerg ing in Sumer and Elam; Sumerian and porto- Elamite scripts; trade networks across Iranian plateau flourishing. Esis tan: 3200-2800 presence at Shahr-i Sokhta; after 2800 Shahr-i Sokhta important in lapis trade. Fishing communities in Oman and Makran probably in contact.
2600 - 2500 BC: Transition period (Harappa phase 3A, 2600-2450). Many settlements in the plains destroyed or abandoned, some rebuilt, many new settlements founded, probably including Mohenjo-

daro; cultural integration; growing craft se ciali zation; emergence of writing. Mesopotamia: Royal Cemetery at Ur ca. 2600-2450 includes Harappan material; Na mazga V-VI culture in Turkmenia
2500 - 2000 BC: Mature Harappan (Harappa phase 3B 2450-2200; 3C 2200-1900). Cultural unity in Indus plains; separate but related Kulli culture in southern Baluchistan; separate Late Kot-Diji culture in north-western Pakistan; well inte grated internal distribution network; external trade with western neighbors, Gulf and northern Afghanistan where Shortugai is founded; towns and cities; writing; craft specialization and industrial villages. Seatrade: with Umm-an Nar culture in Oman and with Dilmun (Bahrain); Mesopotamia; Akkadian empire; city-states. Ur III empire: trading with Harappans, some Harappans resident there; Helmand culture in Seistan no longer trading with Indus and de clining after 2200;Namaza V-VI culture in Turkmenia, declining from 2200; BMAC established in Northern Afghani stan.
2000 - 1900 BC: Late Harappan (Harappa Phase 3C to 1900). Decline in many towns and cities, especially in Sindh and Cholis tan; introduction of African millets; summer cultivation of rice and millets increasingly important. OCP /Copper Hoards culture in India, Northern Neolithic in Kashmir; Gandhara Grave culture in Swat (Pakistan). Isin-Larsa pe riod in Mesopotamia: Harappan trade now through Dilmun; relations with Wadi Suq cultture in Oman still flourish ing.
1900/1800 BC: The end of the Urban culture in the Indus Valley; disintegration of Indus polity; abandonment of most urban centers in Sindh, Kutch, Makran, and Cholistan; strong regional cultures in Gujarat, interacting with neighbors to south and west, in eastern region, expanding into Ganges-Yamuna doab, and in Kachi plain; destruction and aban donment of settlements in Baluchistan. Post-Harappan cultures in the Greater Indus Valley. OCP /Copper Hoards cul ture in India; Northern Neolithic in Kashmir; Gandhara Grave culture in Swat. Mesopotamia no longer trading through Gulf; BMAC abandoning northern Afghanistan, but settled in Seistan and in contact with Indus region and beyond

3200–2600 BC. The Early Harappan–Indus Civilization Transition is a short period for which ar chaeologists have found the critical cultural changes that led to urbanization. By ca.1900 BC the cities of Mohenjo-daro and Harappa were no longer urban centers. So, too, went the art of writing, and much of the craft and craft specialization associated with the Indus Civilization. As stated earlier, this period has come to be called the Post-urban Phase. Table 4 summarizes this contextual chronology, of which the Harappan Civilization (2500-2000 BC) is a short but highly significant interval. In the following pages, we shall be primarily concerned with this segment of Pakistan's prehistory.

The Origins of the Harappan Civilization and Significance of the Early Indus Cultures: Marshall and Mackay, the first excavators of Mohenjo-daro, proposed that a migration of people from Sumer (Mesopotamia) may have led to the Indus Valley, causing the process of urbanization here akin to the one that was taking place in Mesopotamia. Other proponents of the migration theory included D.H. Gordon and S.N. Kramer. Sir Mortimer Wheeler, a prominent authority on the Harappan Civilization, argued for a migration of "idea of civilization", not people - the idea of civilization was in the air of West Asia in the 3rd millennium BC and the founders of the Harappan Civilization had a model of civilization before them (4).

The later discoveries, however, did not support these migrational or diffusionist views. The fact that city life emerged in Mesopotamia a few centuries before the Indus does not mean that the latter was derived from the former in a direct or indirect way. Moreover, there are several striking differences



A satellite photograph of the Indus Valley showing the cultivated areas along the Indus River, the mountains that frame it to the north and west, the desert to its east that separates it from the peninsular India. The salt wastes and shallow seas surround Kutch to its south. (Jane McIntosh**)**

between the Harappan and Mesopotamian civilizations. The Mesopotamians had a completely different script, a much greater use of bronze, different settlement layouts, and a large-scale canal system of the kind that seems absent in the Harappan Civilization. If the Harappan Civilization cannot be explained as an offshoot or offspring of the Mesopotamian civilization, what is the alternative?

The excavations at Mehrgarh in Baluchistan (20,21) are particularly interesting and important in this regard since we now have documentation that the foundation of the Harappan Civilization was laid in the sixth or even seventh millennium BC. There is, a long history of food producing, village farming communities in this region and it must be in this cultural environment that we seek the roots of the Harappan urban system. The record of these neolithic and chalcolithic communities is a complex and varied one that has not yet been fully understood, or even exposed for examination. However, the continuity of this cultural material, all set within a pattern of regional stylistic variation, is such that it can be formed into a tradition of life during the millennia preceding urbanization. That is, the cultural history of Pakistan during this period does not seem to incorporate any major discontinuities or disjunctions. Migration in and out of the region can reasonably be projected to have been a part of this history, if only for the fact that the movement of populations, both large and small, especially in this part of the sub-continent, are relatively constant, pervasive feature of life. But the archaeological record, as we know it, does not indicate a wholesale replacement of population or culture during this early period, prior to urbanization in the greater Indus valley. On the contrary, the continuity and gradual internal development of this cultural tradition is abundantly apparent. The pace of change was clearly varied; however, this should not be used to mask the fact that indigenous change is the dominant theme revealed by excavation.

On the basis of this cultural continuity his later research in Sindh and Baluchistan, Mughal offered the first comprehensive analysis of the evidence from pre-urban sites in the Indus valley and north Baluchistan (14). Mughal compared the whole range of evidence (pottery, stone tools, metal artifacts, architecture, etc.) from pre-urban and urban levels, and explored the relationship between the two stages. The pre-urban phase showed large fortified settlements, a fairly high level of expertise in specialized crafts such as stone working, metal crafting, and bead making, the use of wheeled transport, and the existence of trade networks. The range of raw materials used by the Early Harappans was more or less the same as that used in the Mature Harappan phase. The two things lacking were large cities and increased levels of craft specialization. Mughal argued that the 'pre-Harappan' (preurban) phase actually represented the early, formative phase of the Harappan (urban) culture and that the term 'pre-Harappan' should therefore be replaced by 'Early Harappan'.

Mughal’s argument was strengthened by the small finds at Kot Diji, an archaeological site in Sindh. In a detailed analysis of these finds Mughal convincingly showed that an artifactual continuity existed for this site from the Pre-urban "Kot Dijian" levels through to the Mature Harappan (15). Most archaeologists who deal with Harappan material feel reasonably secure in asserting that historical and cultural continuity are the predominant themes in this regional sequence. Apart from the fact that some features of the mature Harappan culture were already in place in the Early Harappan phase,

what



The Harappan Civilization was the most expansive civilization of the Old World

is also visible is a gradual transition from a variety of regional traditions towards a level of cultural uniformity, cutting across regions, a process that the Allchins call 'cultural convergence' (16) and Kenoyer ‘Integration Era’.

The development of agriculture in Baluchistan in the 7th millennium BC, the emergence of farming communities in Baluchistan and western Sindh, and the formation of several regional cultures, *ca.* 3500-2500 BC, in Baluchistan, Sindh, Punjab, Cholistan and the Pothwar region has been discussed in ample details in Volume II (*A Prelude to Civilization*) of this series. We review this evidence in Chapter 5. Therein we shall also discuss the possible mechanism that brought about the emergence of the Harappan Civilization on the shoulders of the Early Harappan phase. Some inferences will also be made about the social and political processes that were underway but they will be discussed in details

in Volume IV (Harappan

Civilization - *Theoretical and the Abstract*).
The Harappan Country and its Climate: The geographical area of the Harappan Civilization is truly vast. It lies within 250 and 350 N. latitude - a range which also covers the two contemporary civilizations of Mesopotamia and Egypt, the areas which today have almost desert climatic conditions and which would have been complete deserts but for the great rivers that bring

seasonal floods to revivify the parched lands that have themselves been built up by silt deposits. It covered an enormous area, stretching from the Indo-Iranian border in Baluchistan to the Gulf of Cambay; from the borders of Afghanistan/Tajikistan to the Indo-Ganghetic Divide; covering almost all of the Pashtun country, Baluchistan, Sindh, Punjab, and a part of Kashmir. Bulk of this area lies within the modern state of Pakistan, mainly between two river systems - the Indus and the Ghaggar-Hakra. While Harappan Civilization was most pervasive in the Indus Valley, its manifestations extended well into the adjoining deserts of India (the Thar) and was culturally related to agricultural communities in the western piedmont of Baluchistan and Afghanistan.

The essential features of the land of the Harappan Civilization is the Indus River and its tributaries. They included, besides Kabul, Swat, Jhelum, Chenab, Ravi, etc, the river Sutlej which is now almost entirely in India. The Indus tributaries also included a braided river system which is now largely dry. Its bed lies partly in India (in Haryana, Indian Punjab, and northern Rajasthan, along the Indo-Pak borders) and partly in Pakistan (mainly in Cholistan, down to Fort Derawar in Bhawalpur). The remnants of the river system itself, mostly dry, is called Ghaggar in India and Hakra in Pakistan. The Indus River, along with all of its tributaries, forms a vast flood plain which we call the Indus plains. This vast plain is flanked by several mountain ranges, deep valleys, and passes, which constitute Baluchistan and the Pakhtunkhaw (Pashtun country).

There is some controversy on the climatic conditions in the Harappan country. Sir John Marshall suggested that there was a period of somewhat higher rainfall in Pakistan and western India between 3000 and 2000 B.C., although some would like to bring the date of the wet period down to 500 B.C. On the other hand, these areas have been subjected to severe Post-Pleistocene desiccation. Under these conflicting opinions it is difficult to be dogmatic on the actual climatic conditions. Animals like the elephant, rhinoceros and tiger, which during the last few centuries have become extinct in the region, were known to the Harappan people and this would indicate wetter climate.

The Indus valley is a dry country but it does receive a moderate rainfall from 125 to 625 mm a year, some of it is the result of summer monsoons and some winter westerly winds. A large part of Pakistan receives its rainfall, as meager as it is, in the winter. The precipitation in the northern hills is much higher due to the summer monsoons which are only sporadic in the South. In prehistoric times, winter rains and the floodwaters provided the needed moisture for the cultivation of barley and wheat, while the summer rains made the cultivation of millets and other summer crops possible. Sheep, goats, and cattle dominated as domesticated animals and the environment of the Greater Indus Valley should be viewed in this context. We shall continue this discussion in Chapter 4 and 5 .

Harappan sites: Settlements of the Indus Civilization are found over a million square km. The most westerly settlement is a fortified site called Sutkagen-dor, near the border between Pakistan and Iran and close to the Arabian Sea. The site of Lothal in Gujarat (India) anchors the south-western corner of the Indus Civilization. The north-eastern sites are found in the Indo-Gangetic Divide (Indian Punjab

and Haryana). There is one settlement at Manda in Jammu (Kashmir), and another near Ropar on the upper Sutlej river near the Pak-India border. The greatest concentration of sites is in an area in Pakistan known as Cholistan ('Desert Country'), with 185 Indus Civilization settlements closely spaced around Ganweriwala in the inland delta of the Hakra river. The most northerly site is Shortughai in northern Afghanistan. It was almost certainly a trading center.

The number of known Harappan sites has grown hugely: from thirty-seven in 1947 to more than a thousand today. Most of this explosive growth has come from India and it is not known as to how many of them belong to the Mature Harappan and how many to the Early or Late Harappan Phases. The first excavations in the Indus Valley had revealed the cities of Mohenjo-daro and Harappa. Subsequently a number of other towns were investigated, such as Nausharo, Chanhu-daro, Allahdino, Kalibangan, and Dholavira. The fact that the Harappan Civilization was urban does not mean that all or even most of its settlements had an urban character. A majority were, in fact, villages. A few of these villages, pastoral camps, and small settlements of specialist artisans have been excavated. These activities, coupled with the regional surveys have helped to build up a general picture of the distribution of Indus sites and their relationship to the landscape.

It is not easy to estimate the exact size of ancient settlements, as they are often spread over many mounds and buried under layers of alluvium. Nevertheless, it is clear that the Harappan sites varied a great deal in size and function, from large cities to small pastoral camps. The largest settlements include Mohenjo-daro (over 200 ha), Harappa (over 150 ha), Ganweriwala (over 100 ha), Rakhigarhi (over 80 ha), and Dholavira (about 60 ha). Ganweriwala in Cholistan, with an estimated population of about 35,000, seems to have been as large as Mohenjo-daro. Other large sites (about 50 ha) are Tharo, Waro Daro, and Lakhuenjo-daro in Sindh, and Nondowri in Baluchistan. The second rung of Harappan settlements are moderate-sized sites ranging between 10 and 50 ha, such as Judeirjo-daro and Kalibangan. Then, there are the even smaller sites of 5-10 ha, such as Amri, Lothal, and Chanhudaro. The many settlements in the 1-5 ha range include Allahdino, Kot Diji, Rupar, Balakot, Surkotada, Nausharo, and Ghazi Shah. There are also settlements even smaller than these.

The Harappan Civilization has been defined in terms of cities and the four principal settlements so far excavated provide the material to reconstruct the cultural content of the civilization. Two lie in Pakistan: Harappa is situated on an old bed of the river Ravi in Sahiwal District of Punjab, and Mohenjo-daro is on the right bank of the Indus river in Larkana District of Sindh. The other two sites are in western India; Lothal is situated on the Sabarmati river at the head of the gulf of Cambay on the west coast of India, and Kalibangan lies just across the border along the left bank of the now-dry Ghaggar river in northern Rajasthan. Both of these sites are rather small in size.

Harappan cities show a twin-settlement pattern - a 'citadel' and a 'lower town', as can be seen in the excavated remains of several sites, such as Mohenjo-daro, and Sutkagendor. Although some archaeologists seek the origin of the citadel or high mound from the 'ziggurat' model of Mesopotamia, the two formations are entirely different in concept. In the case of Kalibangan this higher citadel ground is due to an earlier occupation below. But in the case of Harappa and Sutkagendor the two sites are deliberately divided. At Mohenjo-daro they are separated by a wide gap between the two, the gap at one time being certainly flooded and hence Wheeler conceives of a canal or a branch of the Indus in between them. It is possible that the two sites were simultaneously occupied on either side of a channel. Some settlements have more than two separate sectors. For example, Harappa is a multimound site while some other multi-sector cities are segmented by surrounding town walls.

We shall discuss this topic further in Chapter 13. What are the implications of such divisions, opinions differ strongly. We shall examine these speculations in Volume IV (*Harappan Civilization - Theoretical and the Abstract*).

The Harappan cities are believed to be unique in their conception. The north-south alignment of long thoroughfares at such an early period is unparalleled in history. Such an idealized proposition of town planning could be based on the Early Harappan precedent as is surmised from the aerial photograph of Rehman Dheri in western Punjab. Such a concept of planned ‘boulevards’, ‘streets’, and ‘lanes’ is also confirmed by a straight alignment of house walls along the streets. Of still greater significance are the long covered public drains built through the middle of the wide streets, with manholes in between for the ultimate removal of rubbish. Such drains were properly connected with house-drains and water chutes coming from private houses which had a highly developed system of brick-on-edge flooring in the bathrooms. It appears that the long thoroughfares have been dictated by wind direction. The street patterning was designed to catch the fresh breeze as appreciated by those who are familiar with the local climate and environment and, probably for the same purpose, the house ventilations were opened on the side of the main streets. This arrangement and the high sense of sanitation and strict observance of the rules of regularity suggest a community of people who were certainly disciplinary and punctilious in their behavior patterns at least during the mature phase of the Harappan Civilization.

It is possible that Mohenjo-daro was the principal metropolis of the Indus Civilization. Centrally located in Sindh between the Indus and Eastern Nara Rivers, with the Punjab to its northeast, Gujarat to its southwest, and the Kachi plain to its west, it was well placed to control communication throughout the Indus realm. It was also the largest settlement by far, its known area exceeding that of Harappa by half as much again. Among the workshops scattered throughout the city or concentrated in the suburbs, there were representatives of all types of industrial activity, and the houses yielded artifacts of every kind manufactured by the Indus people, including many inscribed seals. On its citadel was constructed a unique feature, the Great Bath, a large watertight basin set in the center of a complex of rooms and plausibly interpreted as a religious structure, related to a water-centered cult.

Harappa was also a great city, with a similar range of industries and similar signs of affluence as is evident at Mohenjo-daro. It lay near the edge of the Indus land in the Punjab where it could control access to the resources of the Lower Himalayas in the north and the Sulaimans in the west. The other major cities that have been identified were also situated toward the edges of the Indus domains: Rakhighari in the east, Ganweriwala in the center of the Hakra Valley, and Dholavira in Gujarat. Of these Ganweriwala is known only from surface traces, and excavations at Rakhighari have been limited, but extensive investigations at Dholavira have provided valuable evidence of the development of the city through time, its size gradually increasing and its citadel becoming more complex. Where Mohenjo-daro relied on a large number of wells for domestic water, Dholavira had massive reservoirs. Many other differences as well as similarities between these cities underline two principal characteristics of the Harappan Civilization: on the one hand a strong and uniform cultural pattern that produced the same range of artifacts, the same types of houses, the same civic arrangement of separate walled mounds, in each city and town; on the other hand, a huge diversity in the way the urban layout was effected and in other fundamental aspects of life.

In addition to the five cities, many towns shared features of the urban layout such as the division into separate walled mounds or areas, the efficient drainage system, and the well-built houses. Often these

towns had substantial industrial areas, producing a range of artifacts, and they were well supplied with the high-caliber standardized craft products characteristic of the Harappan Civilization. These included fine pottery, tools of high-quality flint, a range of generally simple metal artifacts, many charming terra-cotta figurines of humans and animals, inscribed seals, and a great variety of personal ornaments made of shell, gemstones, metals, and several manufactured materials including faience. In addition there must have been many fine products in materials that have perished but of which few tantalizing traces survive, such as wood and textiles.

The majority of the Indus people, however, were farmers or pastoralists. Few of their settlements have been excavated, but these few indicate that even the ordinary farmer probably had access to good-quality craft products. Arable farmers dwelt in small permanent villages, and there were also temporary seasonal settlements occupied by pastoralists in the areas where they took their animals for seasonal grazing. It is likely that, as today, pastoralists also acted as carriers for the transport of goods. While the agriculture of the Indus Civilization was based mainly on barley, wheat, and pulses as in earlier times, other crops, notably rice and various millets, were also grown in some regions of the Indus realm, especially after 2,200 BC.
The distribution of Harappan sites is an involved and controversial topic. It is, nevertheless, an important theme in archaeological research for any civilization. We are, therefore, devoting a full chapter (Chapter 6) to this vital subject. We shall also revert to the subject of town planning and other characteristics of the Indus cities in subsequent pages.

Discovery and Excavation: The ruins of Harrappa were first described in 1842 by Charles Masson in his *Narrative of Various Journeys in Balochistan, Afghanistan, and the Punjab*, where locals talked of an ancient city extending "thirteen cosses" (about 25 miles), but no archaeological interest would attach to this for nearly a century. In 1856, General Alexander Cunningham, later Director General of the Archeological Survey of India, visited Harappa where the British engineers John and William Brunton were laying the East Indian Railway Company line connecting the cities of Karachi and Lahore by using the bricks of the Harappan ruins. In 1872–75 Alexander Cunningham published the first Harappan seal. It was half a century later, in 1912, that more Harappan seals were discovered by J. Fleet, prompting an excavation campaign under Sir John Hubert Marshall in 1921–22 and resulting in the discovery of the civilizational remains at Harappa. This is an epic story and we devote a full chapter (Chapter 3) to this interesting tale.

A preview of the Harappan Material Culture: Our knowledge about the Harappan Civilization is derived almost entirely from archaeological research. This knowledge has advanced considerably since Charles Masson first reported the vast mounds of Harappa in 1826. A valuable mass of information relating to town planning and architecture, art and crafts and the way of life of the Harappans emerged between 1924 and 1929 from the description of artifacts and from inferences drawn from them. Most of this work was, however, centered around the cities, such as Harappa, Mohenjodaro, Chanhu-daro, Balakot, Lothal, Kalibangan, etc. at the expense of villages and settlements of subsistence economy. The subsequent excavators followed almost the same trends in thought and exhibited the same interests in bricks and mortar, the seals, the script, the figurines, and the like. The settlement pattern, the direction of cultural expansion, village-town interaction, city-hinterland relationship, means and relationships of production, and the impact of the Indus legacy on subsequent development of the region were largely neglected. Fortunately, these are the areas where much of the research efforts are presently being expended. Since These areas of research are relatively new, there is not much accumulated data yet available on the subject. As a consequence,

therefore, the Indus Civilization is still described largely in terms of cities and towns.

The uniformity of the Harappan material culture has been frequently commented on as one of the unique features of the Harappan Civilization. It has been noted that while the earlier phases of this Bronze Age cultural complex show varying patterns in different geographical regions of the Greater Indus Valley, it imposes a certain uniformity in its basic cultural manifestation and hence there is little difficulty in identifying the urban pattern associated with it. Notwithstanding this cultural uniformity, we find some regional variation within the Harappan region itself and at least three such regional variations ('Domains', according to Possehl) can very distinctly be identified (17). We shall approach this subject again a little later.

There was a characteristic thick and sturdy pottery. Specific forms of bronze tools such as curved razors, chisels in various sizes and shapes, and flat axes occur across the sites. At the same time there is a remarkable paucity of distinctive tool types in ground stone and flaked stone which are a common feature of a post-Neolithic culture elsewhere. Seals give evidence of another level of artistic creativity. These are shaped for easy handling and have rectangular faces carved with pictorial symbols and writing. Other characteristic elements are beautifully cut and polished cubical stone weights that were only one part of a uniform weighing system; marine shell and ivory with multiple uses; domestic artifacts; baked clay missiles balls and flat 'cakes' for paving floors and for heat retention at fireplaces; and ornaments made of faience, bronze, silver, gold and semi-precious stones of attractive colors. The high degree of technological achievements of the Indus people during the Harappan period can be seen in the cutting, polishing, etching, and drilling of the very long carnelian beads, the preparation of metal alloys, especially bronze, the possible use of lost-wax casting, the quality of the carving of square stamp seals, the manufacture of high quality faience, and finally the preparation of very high quality ceramics. The bulk of this volume is dedicated to these subjects.

A special feature of Harappan citizens is their keen interest in pyrotechnology, the knowledge of fire. Making of pottery and glazing or coloring it in diverse effects is one aspect. Production of lime plaster, and making and manipulating of faience into desirable objects are some of the other objectives which depend on pyrotechnology. Extracting copper from the copper ore, alloying it with tin, lead or arsenic to make bronze, and forming it into diverse objects of utilization and art are the very basis of Bronze Age of which Harappan Civilization was a part.

Culturally significant is a uniform system of writing. These writing symbols are preserved on steatite seals, clay tablets, copper chips, and sometimes on pottery. The inscriptions are rather short and they have so far defied all attempts for decipherment. Because of the brevity of these inscriptions, as well as some other considerations, some scholars have recently started to deny them as being a script, at least not being a script that encodes speech. We shall tackle this subject in Volume IV (*Harappan Civilization - Theoretical and the Abstrac*t).

The widely diffused use of a uniform script (or written symbols), and the extent of trade itself indicate that there must have been an all-embracing and well organized network of communication, both between the cities of the Indus world and beyond to other major centers of civilization. This implies the use of pack-animals and the organization of caravans, and the presence of further specialized groups to carry out this function. Recent evidence suggests that such communities may have been clearly divided, in terms of their way of life and domicile, from those who inhabited the major settlements of the plains, perhaps as pastoral nomads or semi-nomads, not unlike the modern

Pawindahs who combine with their nomadic and pastoral way of life a major role in the trade between Afghanistan and the Indus basin. The cultural uniformity of the settlements over such a wide area leaves no doubt that the relationship between the city-centered communities of agriculturalists and craftsmen, and those who provided the means of transport and communication, must have been a stable one. This in turn indicates a strong and firmly based political system which held them together and maintained their relations. Precisely what this system was and whence it drew its authority is not yet clear, but of its existence there can be no doubt, nor that it represented a special achievement in the world of the third millennium B.C. We shall devote considerable space to these matters again in Volume IV (*Theoretical and the Abstract*).

Equally apparent is the sophistication of the Harappan engineering. The building and maintenance of Mohenjo-daro and Harappa is a sufficient testimony to this skill, with the maintenance of the grid town plan, the elaborate drainage system that would have had to be regularly re-leveled as the contours of the city grew and changed, the digging of wells on a massive scale (estimated to be 700 at Mohenjodaro alone), the engineering and architectural sophistication of the Great Bath as well as the ordinary residential housing. Of course, the making of standardized bricks and the construction of large kilns to fire them speak for itself.

A major difference between the buildings in large cities and those in smaller towns and villages was in the type and combination of raw materials used. In villages, houses were made mostly of mudbrick, with the additional use of mud and reeds; stone was occasionally used for foundations or drains. Buildings in towns and cities were made of sun-dried and burnt bricks. In the rocky areas of Kutch and Saurashtra, as well as the settlements in Makran, however, there was extensive use of stone. The massive fortification walls with a veneer of dressed stone at Dholavira and the remains of stone pillars in the citadel are very distinctive and are not found at any other Harappan site. TheHarappansmadeelaboratearrangements for water for drinking and bathing. The emphasis on providing water for bathing, evident at several sites, suggests that they were very particular about personal hygiene. It is possible that frequent bathing also had a religious or ritualistic aspect. The sources of water were rivers, wells, and reservoirs or cisterns. Mohenjodaro is noted for its large number of wells. Harappa had much fewer wells but a depression in the centre of the city may represent a tank or reservoir that served the city's inhabitants. Well laid-out streets and side lanes associated with an efficient and well-planned drainage system are notable features of Harappan settlements. Even the smaller towns and villages had impressive drainage systems. At Harappa and Mohenjo-daro, terracotta drain pipes directed waste water into open street drains made of baked bricks. These connected into large drains along the main streets, which emptied their contents into the fields outside the city wall. The main drains were covered by corbelled arches made of brick or stone slabs. There were rectangular soak-pits for collecting solid waste at regular intervals. These must have been cleaned out regularly, otherwise the drainage system would have become choked.

Despite all this richness in material culture, to some the Indus civilization does not appear quite as spectacular as the Egyptian, Mesopotamian or the Chinese; it has not yielded treasures of jewelry, gold, and vessels on any comparable scale. The Indus religious thought and practice apparently had no place for ambitious funerary structures like pyramids for the burials of sumptuous offerings for the dead. Neither did the Indus religious life entails the construction of richly appointed temples. However sumptuous the lifestyle of the Harappan elite, the archaeological record is unlikely to reflect it because in Harappan culture there seems to have been no place for ritual burials of wealth. Another feature which puts the Harappan Civilization at second tier to that of Mesopotamia and Egypt is the

conspicuous absence of art; only a few statues have been discovered of which the ‘dancing girl’ and ‘priest king’ are well-known. We shall revisit these topics and try to asses the validity of such conclusions.

Trade and Communication: There is growing evidence of the extent and variety of trade. First, there are the 'granaries' or ‘warehouses’ at Harappa, Mohenjo-daro and Lothal, implying great concentration of wealth, and possibly the government’s involvement in trade. Next, there is the evidence of unprecedented trade in goods produced within the Indus culture region, such as the artifacts of stone, metal, shell, etc. Third, there is the widespread trade with distant parts, both in the form of exports to the Persian Gulf region and of the trading 'colonies' such as that at Shortughai, in northern Afghanistan, or in the form of exotic imports. As we have seen in Vol. II (*A Prelude to Civilization*) of this series, this aspect was already pre-existing, and contacts with Central Asia and eastern Iran for such purposes went back several thousand years, even to the pre-ceramic Neolithic of Baluchistan. In the new context of the Indus Civilization it was evidently more sophisticated and more highly organized than ever before. This is shown by the presence of regulated weights and measures, and of elaborate and well-made seals which were probably used for trading purposes. The question of trade and communication seems to be a favorite subject among archaeologists working in the Indus Valley and it has been given an extensive coverage by a large number of prehistorians. We shall review this evidence in the next volume.

Social Organization, Religion, and State: Notwithstanding the finality of decipherment and the lack of related literary accounts elsewhere in the contemporary world, significant strides have been made to understand the socio-political and religious organization of the Mature Harappans. Various categories of evidence, some of which will be discussed in this volume as we proceed but in more detail in the next volume (*Harappan Civilization Theoretical and the Abstract*), indicate the presence of distinct social and economic classes, both within the cities, as well as in the surrounding hinterland. Perhaps even more important is the evidence for political and ideological integration of major settlements and the emergence of what may be termed "state". The varied and often highly specialized crafts alone indicate this, and some scholars have seen in the variations of house sizes and the localization of blocks and barrack-like dwellings further evidence of class divisions, perhaps even amounting to serfdom. Whether we should speak of class divisions in the Harappan society, or rather of something akin to the later Hindu caste system, is also worthy of consideration. In addition to craft specialists and artisans there must have been an agricultural population, whether living wholly in villages or also in part living in the 'cities'. There must also have been a ruling group who have generally been supposed to have combined the roles of administrators and priests.

The religion of the Harappan Civilization as well as the issue of the Aryan-Dravidian dichotomy is the hot topic of the day. The early perspectives are changing fast and the picture of a priestly state or a society organized around religion is being looked upon critically. Similarly, the very concept of a “Harappan State” is undergoing rapid revision. For the time being it suffices to say that the Harappans probably had no organized religion but lived through a collection of superstitious beliefs and shamanic practices. Although the question of state or non-state is still open, it appears that the Harappan society was not a mirror image of Mesopotamian state or even city-states that has been variously advocated in the past.

Who Were the Harappans? Who were the Harappans? This frequently-asked question is certainly interesting although not central to the understanding of the Harappan Civilization. The question is in

fact ambiguous: Which aspect of “who-ness” is being addressed? Is it ethnicity, language affiliation, a contribution to an historical tradition, or the people who made some distinctive or identifiable body of material culture? In the absence of specificity, an answer to the question could reasonably be stated as: ‘The folks who built the places now called Mohenjo-daro and Harappa or Ganweriwala, among others’. But, one knows that the answer would satisfy no one**.**

The question probably implies a search for linguistic affiliation and origins, most likely a search for ethnic connection. It may even be true that the question has to do with a search for the area from which the Harappans might have migrated. Again, this is not an entirely unworthy problem; although most current thought on Harappan origins has concluded that a migration hypothesized for the genesis of the Harappan Civilization has little substance. Equally to the point is the fact that problems of this kind have proven impossible to solve given a purely archaeological context. Even with a substantial corpus of written historical material, this problem can pose serious difficulties. One could here refer to the Sumerian/Akkadian groups in ancient Mesopotamia and the immense difficulties scholars have had in dealing with that situation in all its complex reality in spite of the almost overwhelming corpus of texts. Thus, historical questions of this kind are best worked on within a theoretical context. There is simply an overwhelming mass of ethnographic and historical data which indicate that material culture does not correlate with ethnicity in spite of the fact that there are occasional instances where these paths do cross.

To begin with, we do not know what these people who built such a vast cultural complex were called. This is because of the failure to decipher the contemporary writings on the Indus seals. However, Mesopotamian context, direct or indirect, has produced some relevant evidence. The contemporary documents there speak of ships coming from Dilmun, Magan and Meluhha (or Melukhkha): Sargon the Great boasts: “The ships from Meluhha. The ships from Magan. The ships from Dilmun. He made tie up alongside the quay of Agade. “Dilmun” or “Talmud”, which is usually identified with the island of Bahrain, is supposed to be the clearinghouse for goods bound for Sumer from the east. From Magan and Meluhha the ships brought copper ingots and implements - carnelian, ivory, shell, lapis lazuli, pearls, spices, etc. - materials specific to the Indus Civilization. On these grounds Magan and Meluhha have been taken to mean 'Indus country'. Particularly Meluhha or Melukhkha, which suggestively resembles the much later prakrit 'Milakkha; or Sanskrit 'Mlecha’, - a name meaning 'a stranger of ill-pronounced speech', and applied to foreigners in Sanskrit literature - has the strongest possibility to be the oldest name of the Indus country. Magan could be the northern corner of Oman along with the western coastal region of Pakistan, which still bears the name of Makran.

Efforts have been made to determine the ‘racial mix’ of these people through anatomical data obtained through the examination of skeletons found at several archaeological sites, more particularly at Harappa. Two conclusions can be drawn from these studies. First, the Harappan people fell into several ‘racial’ prototypes and these data tell us conclusively as to the manifest heterogeneity in the racial mix. Second, the average measurements of cranial length-breadth ratio of the Harappan skeletons are more or less the same as those of the present populations of Pakistan, thus indicating that the so-called ’racial mix’ of the Indus Valley has not changed much since then.

The examination of the cranial measurements of the Harappan skeletons show three categories of inhabitants - Mediterranean type, Austroloid type, and Mongoloid type. This does not tell us much because the data is very coarse and the basis of such a categorization is no longer valid in view of the recent anthropological thought. A number of genetic studies have recently been conducted on the

current populations of Pakistan and none of these suggest any such conclusion. The genetic imprint is predominantly "western" since ca. 50,000 years ago, with the "mongoloid" (the Hazaras) and "Negroid" (the Makranis) infusion being post-Harappan. There is no genetic signature of any Austroloid in the current population, unless we designate the Indian-specific genetic marker as the Austroloid or porto-austroloid. It is surprising that in spite of its irrelevance such a racial categorization is still mentioned so frequently in the literature on the Harappan Civilization.

Archaeological finds have also been used to document the mass immigration of 'new peoples' into ancient Pakistan at various times. These data rely on the observation of sudden cultural traits, such as the form of pottery and the art of pottery decoration. Several cultural discontinuities have thus been documented and these have been assigned to the coming of new inhabitants along with new cultures. This interpretive approach has, however, been questioned. According to modern anthropological thinking, a sudden change in material culture is not necessarily connected with the infusion of new peoples: cultural traits often change indigenously and sometimes abruptly. Anyhow, even if the classical hypothesis is subscribed to, we still do not know who these new peoples were.

Now, where does it all lead us to? It appears that the ethnic and racial make-up of the present day populations primarily derives from the the west with a hefty genetic dose from the East (India) This gene flow seems to be gradual, in small quantum at a time but continuous during the ages. Starting from the spread of *homo sapiens*, a steady stream of different peoples have been coming to this land and assimilating with the populations. The Harappans were, pre-existing

obviously, a product of this admixture. Who these peoples were and where did they specifically come from in the pre-historic times, we do not know.

Contrary to all this is the hypothesis, enthusiastically propagated by some Indian scholars, that proclaims that Harappans were in fact the "Aryans", especially those who were the authors of the Vedas, the question whether they were indigenous or came from outside being immaterial. Although this hypothesis borders on pure absurdity at the present time, judging from the plethora of writings coming out in rapid succession from India and the Indian expatriates in the United States, it would not be surprising if before long this position gains some degree of respectability or simply gets in fashion to accede to this position.

Subsistence: The peoples of the Indus Civilization were farmers and herders who also engaged in some hunting, fishing and gathering. They grew barley and wheat and also cultivated at least two forms of gram, chick peas, field peas, mustard, sesame and cotton. They also used grapes and gathered wild plants such as the Indian jujube. The evidence for the cultivation of rice during the Indus Civilization is poor. The Harappans were large-scale cattle, goat, and sheep keepers. Cattle remains are usually above 50 per cent of the animal remains from excavated sites. This observation, and the cattle imagery in art, make it clear that this was the premier animal in their culture and that it is highly likely that it may have been the principal form of wealth. The Indus peoples also kept substantial numbers of water buffalo.

End of the Harappan Civilization: Early in the second millennium BC, by about 1800-1900 BC, the city of Harappa and its counterpart in Sindh, the grand city of Mohenjo-daro, were no longer functioning urban centers. The Indus Civilization came to an end as a complex socioeconomic system. Human life continued on the plains and in the hills and mountains of Pakistan but the people were no longer organized by class and occupational specialization. While there was continuation of

life, there was also much change. The people seemed to adopt new customs and living habits, their beliefs apparently changed, and what little we know about this period, some new peoples started to make inroad into the Indus territories and under their influence the Indus languages started to change. Gone were the town planning, gone were the sewage system, gone were the seals, gone was the script, and gone was the Indus style in pottery form and decoration. Along with this all, the regional and interregional trade and commerce stopped; there were no more trade caravans going northward and there were no ships sailing to Delmun or to Mesopotamia

What happened? There is no one answer to this question. The issue is still being debated and the issue is the topic of a hefty chapter in Volume IV (*Harappan Civilization - Theoretical and the Abstract*). In the meantime, what can we say is as follows: The Indus civilization arose as a social, economic and cultural phenomenon, produced by the build-up of population on the fertile Indus plains and the hilly slopes of the surrounding areas in the west. The resultant urban society was a delicate balance of internal relations between cities, towns and villages, and of external relations with neighboring peasant and pastoral societies and more distant urban cultures. The end of the Indus urban phase was probably triggered by some major upset of this balance. Such an upheaval could have been produced by any one or more of the causes one can imagine, operating either alone or in combination. In other words, just as the creation and maintenance of the system was the outcome of the successful combination of several factors, so too its breakdown could have been caused by the weakening of anyone of these or the upsetting of their harmonious balance and interaction. Whatever they may have been, what is beyond doubt, and what from our point of view is of primary concern, is that at a certain point in time the urban phenomenon came to an end. There is no use in calling it a ‘transformation’, as Possehl and Kenoyer are prone to. Civilizations arise; they also fall and come to an end. So was the Harappan Civilization or the whole Indus Age.

Changing Theoretical Approaches: Theoretical approaches to such issues as the origins of the Indus Civilization; the role of cultural diffusion and the contribution of ‘foreign’ civilizations such as Mesopotamia; the nature of Harappan state, religion, and social organization; the issues of subsistence economy; the issue of literacy and script; the causes of Harappan decay and demise; and legacy of the Indus cultures, have been changing over time. Newer issues, such as the questions: were the Harappan the Vedic Aryans: was the GhaggarHakra river in fact the mighty Vedic river Sarasvati; did the Harappan Civilization centered around the “Sarasvati” Valley from where it spread to the Indus Valley; was the Harappan Civilization really a literate society; what was the language of the Harppans; what was the Harappan religion; are new. We shall take up some of these issues in Volume IV of this series *(Harappan Civilization - Theoretical and the Abstruct*).

Sources for Studying the Harappan Civilization: For non-literate cultures and for those, like the Indus Civilization, whose writings are undeciphered, archaeological excavation and reconnaissance are the main sources of material used to reconstruct and interpret the past, but the skills of many other disciplines are also utilized. In South Asia, ethnography is particularly valuable, shedding considerable light on economic practices. Asian oral and written history also offers valuable insights into what may have survived from the Indus period into later times. The material legacy of the Harappan culture in Pakistan and to some extent in the borderlands of India could provide useful pointers to the study of the Harappan culture but no serious work of this nature has yet been undertaken.

Archaeology makes it possible to reconstruct many details of the daily life of individuals and

communities in the past and to gain some understanding of how human societies have developed. To this end archaeologists make use not only of the archaeological techniques of field survey, excavation, and typological analysis, but also of techniques adapted from other disciplines, such as aerial photography, ethnoarchaeology, archaeozoology, archaeobotany, and of the technical expertise of other fields, such as physics, chemistry, soil science, medicine, and linguistics. The artifacts made by the Indus people, including pottery and jewelry, and their works of art, such as the rare statues and the abundant figurines and seal carvings, give some insight into their aesthetic sense and artistic ability, as well as providing some information about vanished aspects of their lives, such as clothing, and slight clues to their religion.

Typology and chemical and physical analyses of artifacts offer insights into the practical and social uses to which these objects were put as well as into the movement of goods and materials and the relationships between communities. Detailed studies of artifact distributions and their relationship to architecture and other features can contribute a great deal of information on past activities, such as the methods employed in craft manufacture or the practices related to death and burial, as well as shedding some light on social organization: such studies recently at Mohenjo-daro and Harappa have seen considerable success.

Domestic architecture, unusually well known in the Indus Civilization, can reveal many aspects of daily life, while the relative paucity and considerable diversity of Indus public architecture fuels much speculation about the ritual practices and social and political organization for which these buildings were required. The early scholarly concentration on cities and towns has been balanced by some recent investigations of smaller sites. Extensive surveys have shed considerable light on regional settlement patterns and changes in the landscape, particularly in the river systems, contributing significantly to an understanding of both the development and heyday of the Indus civilization and its later transformation from an urban civilization into smaller-scale farming societies spread over a more extensive area. Taphonomic agents, such as alluviation and erosion, however, have destroyed or concealed settlements in many areas, skewing the picture. Pollen analysis has produced a limited amount of information on past environment. Plant remains have also yielded some data on the economy of the Harappan Civilization, its successors, and its predecessors, and animal remains have provided a great deal more.

The analysis of human bones and other remains can reveal details of people's physical lives, such as their diet and the environmental stresses, diseases, or injuries they suffered. Such analysis may also give insights into population history in particular establishing the extent to which outsiders have been involved in shaping major developments in the subcontinent. Unfortunately, most of the burial places of the Indus people have eluded discovery, and physical anthropological data are therefore relatively limited.

There are, of course, some other sources of information. For example, as mentioned earlier, Mesopotamian texts refer to sea trade with a number of cultures, among whom the one known as Meluhha has been confidently identified with the Indus Civilization. Some light has therefore been shed on the development, nature, and conduct of international trading relations, in which the Indus civilization was a major participant, Indus traders traveling to Mesopotamia and even taking up residence there.

Later religious texts can also be useful in providing clues to aspects of life in the Indus Civilization.

The earliest extant texts, the *Vedas,* were composed largely in the same area that comprised the Indus Civilization. Comparisons between Vedic practices and those attested in later texts composed outside this region, may allow some earlier practices to be sifted out, and attempts can then be made to identify evidence of these among Indus material.

Ethnographic observation of groups operating in circumstances similar to those of the past may provide additional insights into economic practices, manufacturing techniques, the use of particular tools, the function of certain architectural features, and so on; this is particularly relevant in South Asia, which has many unbroken traditions of domestic, industrial, and other activities and whose population includes many pastoralists, as well as tribal groups who pursue a way of life similar in some ways to that of the hunter-gatherers who occupied the region in antiquity.

There is a large volume of scholarship on the Indus Age in general and the Harappan Civilization in particular. Several book-length expositions have been written, some of them quite extensive and general and some addressing particular aspects of this period of cultural change. A number of bibliographies also exist. The Bibliography at the end of this book lists some of these sources. In addition to the written material, a useful Website, www.Harappa.com is an excellent visual source of information.

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Chapter 2.

Bronze Age Civilizations

Introduction! 

respective peripheries or farther away with the regions of contemporary Bronze Age civilizations. Contacts of the Indus Civilization with much farther away Mesopotamia and Central Asian Bronze Age civilizations are known. These interactions would have

to its west and it was this particular atmosphere

been of varied nature; we know through ethnographical and historical accounts that

within which the Indus people interacted with each

interactions need not all be subsumed under trade alone. Hence, some interactions may

Scholars have divided larly evolved cultures. While there were obvious the human past into

have come under the form of expeditions to obtain raw materials, political embassies to

differences, there were manifest similarities. While
three ages: the
Stone

further diplomatic links, or even the seasonal movements of nomadic population criss

studying the Indus Civilization, it is instructive to

***Age*, the *Bronze Age*crossing the whole region. It is also clear that the state may have provided for the**

and the *Iron Age*. The Harappan Civilization, i.e. the larger cultural landscape that spanned from Egypt

urban Phase of the Indus Civilization, belongs to the

movementof people, in the establishment of settlements such as Shortughai, near the

to Pakistan, Mesopotamia, Iran, and Central Asia in

Bronze Age but it was not the only civilization belapis lazuli mines in Afghanistan, and craft centers such as Lothal in Gujarat. These

longing to the Bronze Age: there were at least two that we begin this volume with an overview of this other well-known Bronze Age civilizations contem

interactions, epitomizing open expanding structures may have had other implications

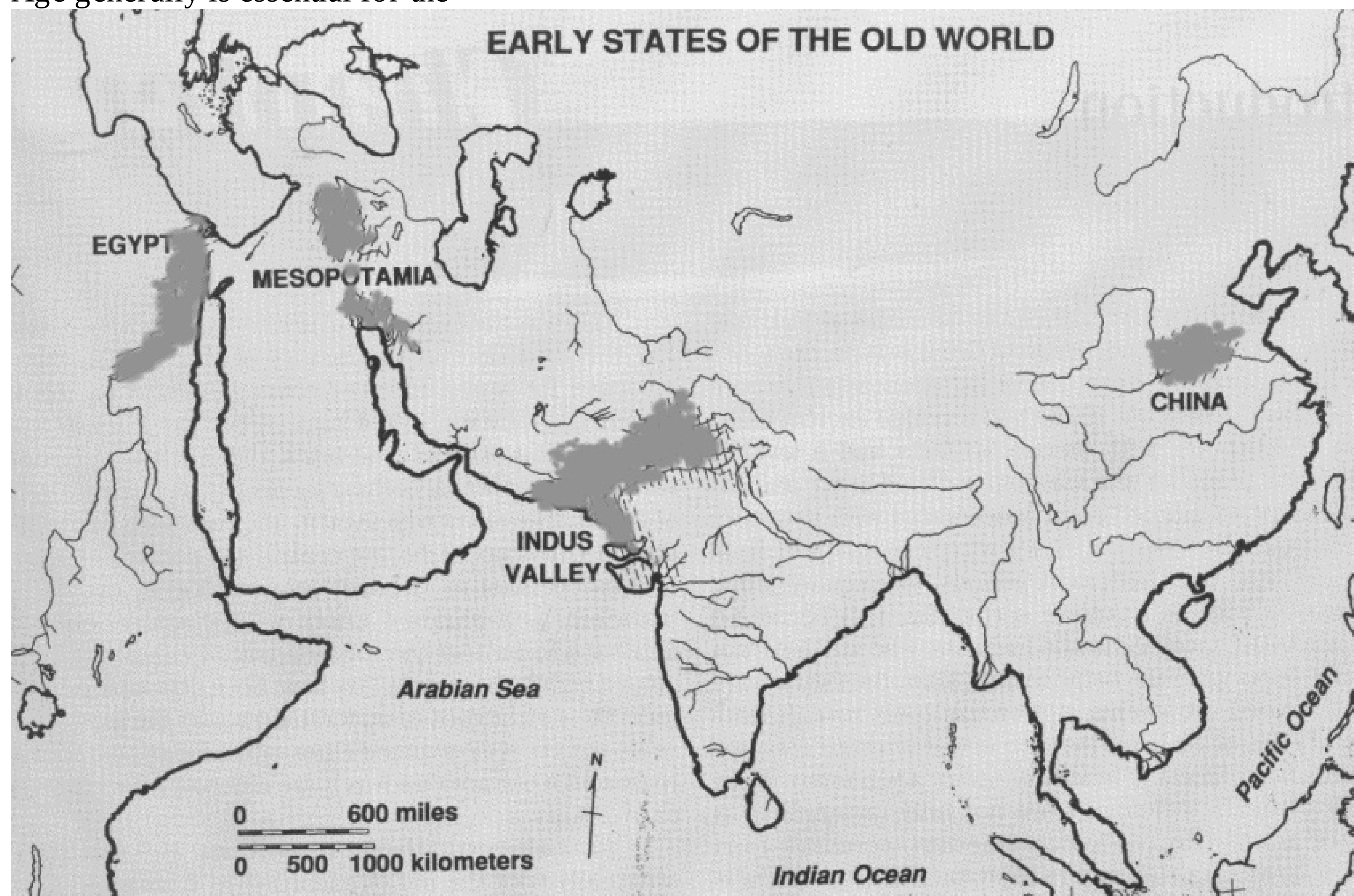
vast region, highlighting some of its common cul

porary to it (The Mesopotamian Civilization, and thesuch as bilingualism or multilingualism.tural traits and pointing to some of the differences.

tural traits and pointing to some of the differences. The Bronze Age is defined as the period in 2500 BC and 3,100 - 2500 BC, re
spectively), and there were at least two equally well-known Bronze Age societies after the Indus (Island of Crete and Huang Ho Valley or Hangzhou civilization in 2,300 BC and 1,700 BC, respectively). Small scale Bronze Age civilizations are also coming to light in Central Asia. This group of the so-called Turanic civilizations is important for the study of the Indus Civilization as it has been shown that the Indus Civiliza tion had some meaningful contacts with the Bronze Age civilization of Central Asia as it did with that of Mesopotamia. All of these Bronze Age civilizations, including the Harappan, flourished for some times but eventually declined and decayed almost simultaneously. What befell them to cause such a sudden and simultaneous decline is not exactly known although many theories

abound. Most likely, their decline and fall happened because of their deli cate economic structures and their built-in social weaknesses.

An overview of the Bronze Age generally is essential for the



Three major civilizations of the Bronze Age

The four major Bronze Age civilizations in the Old World (after Kenoyer) which certain key tools of production - especially understanding of the Harappan Civilization. The craft production - were made of copper or bronze.

Harappan Civilization may be unique among the As the above survey indicates, the Indus people did not exist in a civilizational vacuum;

various Bronze Age civilizations but their peoples
Metal tools could be made in sizes and shapes not

they were part and parcel of a large cultural area that spanned from the Thar Desert in

possible in stone and they made skilled carpentry

did share a number of common problems with other the east to the bank of the Niles on the west, and from the steppes of Central Asia in the

contemporaneous cultures to which they reached
Bronze Age does not mean, however, that the use

north to the Persian Gulf in the south. How far was this cultural sphere integrated with their own particular solutions. The Harappan Civiliof stone or bone tools completely vanished. Non
each other and how far did one Bronze Age region affected the other is not exactly 28known. Some recent studies, such as that of Ratnagar (***The Bronze Age: Unique Instance of a Pre-Industrial World System?*** **Current Anthropology, Volume 42, No.3, envision the whole Old World more or less as one 'world system' but the evidence for such a close and intimate relationship is still wanting.**

Ancient Pakistan - An Archaeological History

Copper ores are not as common on the crust of the earth as those of iron. Even scarer are

metallic tools continued to be used for long period The Bronze Age is considered to be an ex of time in history; in some societies their use is

the ores of tin, arsenic and lead which are needed to make the alloys of bronze. They

panding political economy primarily due to the need common even today. The Bronze Age was replaced

are not to be found in the rich agricultural heartlands of the Indus, the Nile or the

for materials of restricted occurrence such as cop

by the Iron Age which we are passing through atEuphrates valleys, and only occasionally on their immediate fringes, the Las Bela plains this time. from large urban centers, such as those in the Indus

From cultural point of view, Bronze Age is

and Chaghai hills for example. Mostly, they would have to be procured from distant

Valley and Mesopotamia, indicates that their resi

much more than the widespread use of non-ferrous places. For example, the Indus people would have obtained tin from as far a field as

metals. Most importantly, it means differentiation of
those which were not available locally. These im

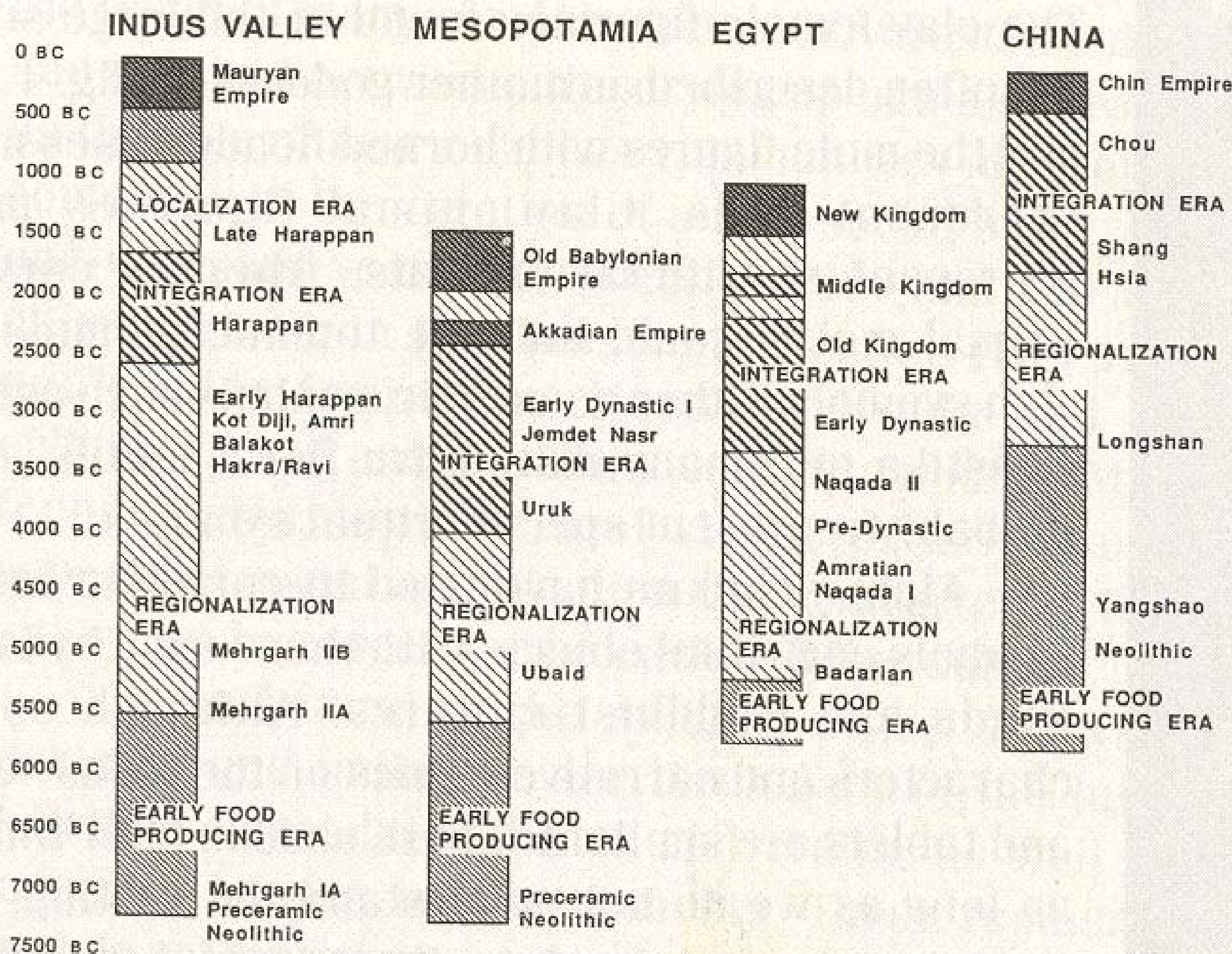
northern Afghanistan - and the presence of their artifacts in Oman across the Arabian society into classes. Another characteristic of theperatives gave birth to wide interaction spheres in

Bronze Age is considerable exploration and long

Sea can reasonably be explained as a quest for copper there. It is, therefore, not difficult

the 3rd millennium BC, in other words, relations with

distance trade. The regions passing through theto comprehend why the locus of the technological and economic transformation was the Bronze Age generally evolved into urban societies pre-urban cultures on their respective peripheries or Bronze Age city, or why the Bronze Age economy was essentially one with sustained -



Comparative timeline for early states of the Old World (after Kenoyer)

although it has not been universally the case. Just Page 16 farther away with the regions of contemporary as Paleolithic sites (Stone Age settlements) are understood to be the sites of hunters and gatherers, and Neolithic sites represent the agricultural and animal-rearing villages of tribal groups (see Volume II: *A Prelude to Civilization*), so too the 'Bronze Age' means a specific social and cultural form, largely urban in characteristics.

Bronze Age civilizations. Contacts of the Indus Civilization with much farther away Mesopotamia and Central Asian Bronze Age civilizations are known. It must be understood that these interactions would have been of varied nature; we know through ethnographical and historical accounts that interactions need not all be subsumed under “trade” alone. Hence, some interactions may have come under the form of expeditions to obtain raw materials, political embassies to further diplomatic links, or even the seasonal movements of nomadic population criss-crossing the whole region. It is also possible that the state may have provided for the movement of people, in the establishment of settlements such as, in the case of the Harappan Civilization, Shortughai near the lapis lazuli mines in Afghanistan, and craft centers such as Lothal in Gujarat (India). These interactions, epitomizing open expanding structures may have had other implications such as bilingualism or multilingualism.

How far was this cultural sphere integrated with each other and how far did one Bronze Age region affected the other is not exactly known. Some recent studies, such as that of Ratnagar (1) , Lamberg-Karlovsky (2)) and During Caspers (3), envision the whole Old World more or less as one ’world system’ but the evidence for such a close and intimate relationship is still wanting. Bronze technology and urbanization required centralized organization and control, because it is through this centralized organization and control that longdistance contacts for the acquisition of technology and the long-distance trade for acquisition of raw materials were possible on a sustainable basis. Any appreciable disruption in these conditions would have disrupted the whole fabric of the bronze economy. In this respect, the Bronze Age economy was more fragile than that based on stone or iron (1). Recent opinions, however, differ from this generalization; while it is undoubtedly true in the case Mesopotamia, the sociopolitical structure in the Indus Civilization does not exactly conform to this generalization.

Copper ores are not as common on the crust of the earth as those of iron. Even scarer are the ores of tin, arsenic and lead which are needed to make the alloys of bronze. They are not to be found in the rich agricultural heartlands of the Indus, the Nile or the Euphrates valleys, and only occasionally on their immediate fringes, the Las Bela plains and Chaghai hills in Baluchistan, for example. Mostly, they would have to be procured from distant places. For example, the Indus people would have obtained tin from as far a field as northern Afghanistan - and the presence of their artifacts in Oman across the Arabian Sea has been explained as a quest for copper there. Mesopotamian economy wholly depended on copper procured from distant lands. It is, therefore, not difficult to comprehend why the locus of the technological and economic transformation was the Bronze Age city, or why the Bronze Age economy was essentially one with sustained and often expanding external trade.

The development of bronze metallurgy involved knowledge of copper and tin/lead mining and smelting, alloying, and casting; all techniques that require experience of ores and pyrotechnology (that is, fuels, temperatures, reduction or oxidation conditions in a kiln, fluxes, different metal-bearing stones, and the varying quality of the charcoals of different woods). Such technological resources could not be readily accessible to the typical tribal household unless it had regular external interaction with towns. Once these towns vanished and their elite dispersed, the knowledge itself declined.

In some parts of the world the traditions of the Bronze Age endured. The pantheons, writing systems, architectural techniques and styles, and literary traditions of the Egyptians and the Mesopotamian saw continuity into the Iron Age. But not so the Indus Bronze Age tradition, where not just technologies but also the occupation of towns and villages were disrupted on large scale. The state or the confederation of city-states and the organization of the trading economy in the Harappan world disintegrated, and what followed is a reversion to a rural economy and culture just as it was before the rise of cities and towns. As the stratified urban institutions weakened, the society at large reverted to the tribal or other types of kin-based relationships that lurked just under the urban façade.

So seemingly familiar are the ancient Near Eastern civilizations - Egypt and Mesopotamia - that we instinctively use them as a standard against which to measure all others. Still, it's inappropriate to do so, for as Bruce Trigger (4) stresses, it's essential to understand both the differences and the similarities between early civilizations if we are to explain how and why such entities developed. This chapter is a selective glimpse of the development of the earliest Old World cities, states, and civilizations in four geographical regions: Mesopotamia, Egypt, Iran and Central Asia, and the Indus

Valley. Each civilization devised ways of grappling with the challenges presented by entirely new social, political, and economic circumstances. Their legacies have survived for millennia, and we can often still recognize some of them within the framework of our modern civilizations.

Research on the Bronze Age of the Old World: The Bronze Age civilizations of Mesopotamia and Egypt have been researched very extensively but scholarship on the Harappan Civilization has to some extent lagged behind. Several reasons have been cited for this gap (5). First, Mesopotamia and Egypt figure in biblical accounts, and their links to the west have long excited the interest of Western scholars. In the late 1700s, Napoleon's military expedition to Egypt included 167 specialists who documented and studied the history and monuments of ancient Egypt. They published their findings in illustrated works that became well-known throughout Europe. Similarly, ancient Mesopotamia was the subject of many early travelers' accounts that romanticized its fabulous ruins. The western explorers who investigated these ruins sought to document places and events known from biblical accounts.

A second reason for the lag in scholarship on the Indus Bronze Age is that the writing system of the Indus Civilization has not been deciphered. Each of the three ancient civilizations possessed a system of writing, and more than a hundred years ago scholars deciphered the Egyptian hieroglyphic and Mesopotamian cuneiform writing systems. The Indus script, however, still remains a mystery. Given this situation, archaeologists are the real authors of this story. These archaeologists, mainly Europeans but also some Americans, who tirelessly worked in the barren hills of Baluchistan, sandy desert of Cholistan, inhospitable plains of Sindh, treacherous passes of the Pashtun country, obscure valleys of Pothwar, and the dry riverbeds of Punjab, are many; some of them are mentioned in Chapter 3 of this book. We are indebted to them for opening to us the secrets of this important period in the prehistory of Pakistan. Pakistani archaeologists of international repute are not many but still there are some. A large crop of Indian archaeologists ripened in mid 1960s and some of them have done relatively good work pertaining to the topic of this book. It is unfortunate, however, that some of them have fallen prey to unwarranted nationalism and religious biases and have played a significant role in misrepresenting history, if not outright its corruption.



An early Bronze Age Civilization - Sumer and Akkad in Mesopotamia

MESOPOTAMIA

During the centuries after 8,000 years ago, pioneering farmers settled the vast alluvial plain bordering the lower Tigris-Euphrates river system, an area called Mesopotamia. These agriculturists shared the heritage of such early Neolithic communities as Jarmo, in the Zagros foothills to the

southeast, and Cayonu at the edge of the Anatolian plateau in the northwest. In fact, they were probably direct descendants of Samarran farmers, who had practiced small-scale irrigation agriculture along the edges of the central Tigris Valley and obtained painted pottery and obsidian through trade and exchange with upland communities. Now advancing onto the southern plains, possibly in search of vacant or more productive lands, these Ubaid farmers (as archaeologists call them) encountered great flood-prone streams bound only by immense mudflats and marshes.

The annual floods in this region began soon after the spring planting season, when young crops were particularly vulnerable. These seasonal overflows deposited rich layers of alluvium, and fifthmillennium B.C. sites have been found buried at depths of up to 16 feet below the modern ground surface. When the waters receded, a long, dry summer followed. At first, farmers cultivated only the well-drained slopes above the river. But eventually they began the arduous task of redirecting the river's flow, even cutting through its banks to channel floodwater onto low-lying fields. Irrigation unlocked the fertility of the deep, stone-free silt that had accumulated on the floodplain for millennia. Barley was the Ubadians' primary grain, but wheat and millet grew well too, along with the date palm and vegetable crops. Their animals included pigs and several kinds of sheep. Domesticated donkeys and oxen performed heavy tasks. The abundant harvests, supplemented by fish and game, more than kept pace with the rapidly growing floodplain communities.

By around 6,500 years ago, Ubaid villagers were beginning to prosper in the southernmost Tigris-Euphrates Valley. A degree of cultural uniformity marked their settlements. Each of their more populous towns, such as Nippur, Eridu, and Uruk in the southern valley centered around a platformbased temple; even the smaller communities had central shrines. Perhaps to obtain the resources lacking in their new homeland, Ubaidians stayed in touch with distant peoples through trade in decorated pottery, obsidian, ornamental stones, copper, and possibly grain.

Important changes ushered in the late Ubaid period, around 5,500 years ago. The population of certain communities rapidly swelled into the thousands as people from outlying area massed together. Expanding irrigation systems in the lower Tigris-Euphrates Valley produced more food for the concentrated populace. Altering the riverine environment on this scale by digging drainage and irrigation channels was a daunting enterprise, one that people could accomplish only with organized communal effort, including a great deal of cooperation and direction. The activity transformed not only the landscape but undoubtedly the nature of the agricultural societies themselves. Certainly we are here witnessing the birth of the first true cities. But what stimulated their development? It is possible that intensified economic or military rivalries in the region forced populations to come together for protection. Or maybe there was a more peaceful genesis, with urbanism an outgrowth of increased agricultural productivity and efficiency, in turn fostering sociocultural changes (social stratification, craft specialization, commerce, and so on) within the urban setting. Whatever the reason, these trends happened simultaneously at various settlements along the lower Tigris-Euphrates Valley as people flocked to the developing cities. These cities seem to have provided the social environments needed for the earliest Mesopotamian states to emerge.

Over several centuries, Uruk's population expanded to possibly as many as 20,000 people. Today, the ruins of Uruk's mud-brick buildings cover nearly 1 square mile in southern Mesopotamia, 150 miles southeast of modern Baghdad. The most ancient parts of Uruk reveal some features of the earliest city. Two massive temple complexes, built in stages and dedicated to the sun-god and to the goddess of fertility served as focal points of political, religious, economic, and cultural activities. Inscribed

clay tablets associated with these structures record that the temple distributed food to the populace and controlled nearby croplands. Growing social and religious complexities, including the rise of powerful kings and priests, kept pace with the city’s physical growth.

Thedevelopments associated with Uruk and the other urban centers were an immediate prelude and stimulus to a new order in southern Mesopotamia around 5,000 years ago. The inscribed tablets, teeming populations, and largescale religious structures indicate that the essential elements of civilization had come together. Uruk marked the beginning of the Sumerians, the first complex urban civilization.

The region known as Sumer encompassed about a dozen largely autonomous political units, called city-states, in the southernmost TigrisEuphrates Valley. About the same number of Akkadian city-states hugged the river to the north, near present-day Baghdad. The Sumerians and their neighbors shared the world's first modern society between 4,900 and 4,350 years ago. Each Sumerian city-state incorporated a major population center - Ur, Lagash, Umma, Nippur, Eridu, and Uruk are examples - as well as some smaller satellite communities and, of course, a great deal of irrigated cropland. These city-states were controlled by hereditary kings, who often fought for dominance with their counterparts in neighboring cities. The Sumerians had an urbanized and technologically accomplished culture, economically dependent on large-scale irrigation agriculture and specialized craft production. They were among the first to refine metals such as gold, silver, and copper and to make bronze alloys. Sophisticated architecture incorporated the true arch and the dome. Other practical innovations included wheeled carts, draft animals, the plow, and sailing boats. Skilled crafters pro



White marble face of a girl Uruk era (al Warkaa)
(3100- 2900 B.C.)

duced fine jewelry and textiles, while artists created sculpture and music. Sumerian merchants and

administrators relied on written records and a counting system based on multiples of 6, which they also applied to measuring time and devising calendars. Their system of law became a basis for later legal codes, and Sumerian contributions to literature included many of the traditions subsequently reflected in the Old Testament.

The influence of these cities reached beyond Mesopotamia through exchange and possibly even colonization. Excavations in northern Iraq, Turkey, and the Nile Valley of Egypt have revealed connections with Uruk through trade in prestige goods such as pottery, carved ivory, and lapis. These valued products furnished the tombs of Sumerian elites in a society where social differentiation was becoming more pronounced.

Among the prerogatives of elite members of society was the right to burial in a lavish tomb. Sir Leonard Woolley's excavations of the 4,500-yearold "royal" tombs at Ur in the 1920s revealed that King Abargi and Queen Puabi were each accompanied in death by rich offerings - ceremonial vessels, tools, musical instruments, and even chariots complete with their animals and, apparently, also their human attendants - arranged within the burial pits. Woolley interpreted other human remains found in association with these elite individuals as the men and women of their court, who were bedecked with precious jewelry and then sealed into the tombs.

Mesopotamiancitizensconstructedbrick walls around their city perimeters for security. The heart of each urban center was its sacred district, dominated by a grand temple and flanked by noble houses. In addition to a patron deity associated with each city, citizens worshipped many other gods. Chief among them was Enlil, the god of the skys. Like most Mesopotamian gods, Enlil exhibited remarkably human characteristics, taking a fatherly concern for mortals and their daily affairs but also meting out punishment and misfortune. Some cities, like Ur, regularly augmented their shrines and eventually created an impressive artificial mountain called a *ziggurat* (see the attached figure). Rising from an elevated platform roughly the size of a football field, these stepped temples were solidly built of millions of molded and baked mud bricks.

Outside the ceremonial district, narrow unpaved alleyways twisted through crowded residential precincts. Much like city dwellers everywhere, Sumerians endured social problems and pollution in their urban environment. The size and location of individual homes correlated with family wealth and



A golden piece from the city of Ur

position. Contemporary written accounts indicate that the populace comprised three general classes: nobility, commoners, and slaves. Some slaves were formerly free citizens who had fallen on hard times and sold themselves into bondage; others were captives taken in conflicts with neighboring citystates. Some of the commoners specialized in craft or merchant activities, but many were farmers with



A partially reconstructed Ziggurat at Ur. There was a temple built atop of this structure. There was also an arched entranceway at the top of the stairs

fields and herds just beyond the surrounding walls.The houses of all but the nobility were generally one story, with several rooms opening onto a central courtyard. Wall and floor coverings brightened

the interiors, which were furnished with wooden tables, chairs, and beds and an assortment of household equipment for cooking and storage.

From our perspective, their writing system was perhaps the Sumerians' most significant invention, enabling us to discover more about them than their other artifacts and monuments could ever reveal. Literacy was a hard-won accomplishment. By about 5,000 years ago, the original pictographic form of Sumerian writing was evolving into a more flexible writing system using hundreds of standardized signs. Highly trained scribes formed the characteristic wedge-shaped, or cuneiform, script by pressing a reed stylus onto damp clay pads; these tablets were then baked to preserve them. Ninety percent of early Sumerian writing concerned economic, legal, and administrative matters; this shows that the Sumerians belonged to a complex and bureaucratic society. Later scribes recorded more historical and literary works, including several epic accounts featuring the adventures of Gilgamesh, an early Uruk king and culture hero reputed to have performed many amazing deeds in the face of overwhelming odds.

The loose conglomeration of Mesopotamian city-states faced hard times after around 4,500 years ago. At least part of the problem may have been their long dependence on irrigation agriculture, which was slowly destroying the fertility of their fields because the irrigation water deposited soluble mineral salts on the soil. Other researchers question the hard evidence on which these inferences are based, and this area needs more research. Another part of the problem was that this early civilization spent much of its energy in fruitless internal competition. Clustered together within a small area, the city-states of Sumer and neighboring Akkad, to the north, vied with one another for supremacy in commerce, prestige, and religion.

Finally, around 2334 B.C., a minor Akkadian official assumed the name Sargon of Agade and led armies from the north to victory in the Sumerian lands and united what had been a collection of citystates into a territorial state. Military expansion led to economic, political, and linguistic dominance over a broad area. Under Sargon, his sons, and grandsons, the Akkadian state endured only a century before dissolving. But once it began, the unification process continued on and off for many centuries in Mesopotamia - next under the kings of Ur and later (about 3,800 years ago) under Hammurabi of Babylon, famed for his "eye for an eye" code of law, among other accomplishments. Soon after the reign of Hammurabi, the ancient lands were incorporated into the realm of the Assyrians until 2,600 years ago, when a new Babylonian empire dominance under King Nebuchadnezzar.

From the perspective prehistoric Mesopotamian cuneiform documents offer us quite a few interesting points. During the Early Dynastic Period a land known as Meluhha is first attested in the Mesopotamian cuneiform documents. There is also a reference in a boast by Sargon of Akkad (2334-2279 BC) which has been translated by Samuel N. Kramer (12):

The ships from Meluhha,
the ships from Magan,
the ships from Dilmun,
he made tie-up alongside the quay of Akkad. We know from a number of pieces of evidence that Dilmun was the Island of Bahrain in the Arabian Gulf, and the near shores of the Arabian Peninsula. Magan was northern Oman, the Makran regiion of Baluchistan, and perhaps part of the Iranian coast around the Straits of Hormuz. Meluhha then was a reference to the Greater Indus Region, including

the Indus Civilization.

Evidence that accumulated through excavations first at Ur, Kish and Susa, then Tell Asmar, Tell Agrab and other places, provided information of undeniable trade between ancient Pakistan and Mesopotamia. How did the objects get there? Most archaeologists in the early decades of the last century seem to have shared Ernest J.H. Mackay's view that contact was by sea as well as overland. It is now clear that by the early second millennium BC, the Mesopotamians had a significant interest in the Arabian Gulf, which they called the 'Lower Sea'. This was described by Leo Oppenheim in a paper, '*Seafaring Merchants of Ur*' (1954) in which he outreclaimed

Pakistan, lined the maritime commerce in the Gulf and explored the locations of Dilmun, Magan and Meluhha. His essay was actually an extended book review of the report on cuneiform documents from Ur by H.H. Figulla and W.J. Martin (1953). Because Dilmun (Bahrain) is not a source of copper ore and had little fuel for smelting, it was clear that it was a Asia in the third millennium BC. The work was pioneered by scholars such as Ernest J.R. Mackay, Peter B. Cornwall and the Danish team that excavated on Bahrain Island just after World War II. What they have discovered supports the cuneiform documents, and adds breadth to them. The current authoritative source on the archaeology of the Gulf region is by Daniel Potts and Shereen Ratnagar.


An example of cuneiform writing

trading post: for Oppenheim a kind of 'window' into the eastern Gulf and beyond to the Arabian Sea.

Maritime trade in the Gulf, and Arabian Sea trade, was a source of state revenue because the palace levied taxes on the imports. These imports were also important to the temple. Travels to Telmun are repeatedly mentioned in a group of tablets which come from the archives of the temple of the goddess Ningal and list votive offerings, incoming tithe, etc. The contexts suggest that returning sailors were wont to offer the deity in gratitude a share of their goods.

This commercial activity can be classed as goal oriented behavior, aimed at meeting demand and making a profit. The most prominent materials in the written record are copper, pearls, lapis lazuli, carnelian and exotic animals, not available to the common people in Mesopotamia. However, they were very much a part of the elite way of life there. The temple also needed many of them to build and maintain the cult system. So, the cuneiform record has its usual bias; it tells of the activities of the state and other elite institutions and individuals.

Meluhha was beyond Magan and is most frequently associated with the lands of the Harappan Civilization. Cuneiform documents composed before the time of Hammurabi contain 76 citations to Meluhha (13). The 'Meluhha Trade' was high value, state supported commercial activity aimed at satisfying the needs of an elite stratum of this ancient society. This is the stuff of ancient history, made alive by written documents. It provided a stimulus for archaeologists to go into the Gulf and find sites with evidence for this fascinating commerce that linked so many of the diverse cultures of Middle EGYPT

The pyramids of Egypt remain unrivaled as the ancient world's most imposing monuments. They have adorned the banks of the Nile for so long that they seem timeless. Even so, Egyptian culture was rooted in the Nile Valley long before the pyramids.

Archaeological evidence of these most ancient Nile cultures is rarely preserved in the unstable river floodplain. Still, excavations reveal that the early farmers grew Near Eastern varieties of wheat and barley as well as raising sheep and goats first domesticated in the same region. Neolithic villages lined the great river's banks by 6,000 years ago.


Pyramids are the best known architectural features of the Old Kingdom

Even at this early stage, settlements in the section of the valley known as Upper Egypt contrasted somewhat with those in the delta region, called Lower Egypt, close to the river's mouth. Archaeologists recognize a Mesopotamian influence at work among the Upper Egypt villagers, possibly introduced through direct contact or by way of Palestinian traders. Mineral resources, especially gold, apparently drew outsiders to the region.

Around 5,300 years ago, increasing political and social cohesion brought some of these Upper Egypt settlements together as local chiefdoms. Walls protected the towns of Naqada and Hierakonpolis, and well-stocked stone and brick tombs marked the social status enjoyed by important individuals. Pottery making and trading became specialized economic enterprises. Continuing contact with Mesopotamian cultures may have stimulated these developments, although researchers do not yet have evidence of comparable Egyptian influence in the other direction.

In any event, during the next few centuries, this part of the Nile Valley transformed rapidly into a

strong territorial state. Historical tradition and written evidence, including the Narmer Palette, a reliefcarved stone plaque from Hierakonpolis (Figure below), record that one of Upper Egypt's early chiefs took the name Narmer and seized other



Reverse and obverse sides of Narmer Palette Narmer, in the traditional pose of smiting the enemies of Egypt, ca. 3100 BC

communities of that region, successfully exerting his control over the delta villages in the north as well. This unification of Upper and Lower Egypt under Narmer, the traditional beginning of the First Dynasty of Egyptian civilization, dates to around 5,000 years ago (3000 B.C.). The merger of Nile Valley societies under one king marked an important milestone in the development of ancient Egypt by creating the world's first nation-state.

After the first unification period, a 425-year span known as Old Kingdom times (4,575 - 4,150 years ago) represented the first full flowering of Nile Valley civilization. Most of the estimated population of 1 to 3 million people lived in the far south. The ruler, or pharaoh, was the supreme power of the society. Under his direction, Egypt became a wonder of the ancient world and a source of endless fascination for millennia to follow.

The familiar Old Kingdom pyramids on the Nile's west bank at Giza evolved out of a tradition of

royal tomb building that began at Hierakonpolis. In that early community, brick-lined burial pits were dug with adjoining chambers to stock the offerings for a deceased king's afterlife, and these rooms were then capped with a low, rectangular brick tomb. The scale of these structures increased as successive rulers outdid their predecessors. The monumental pyramids are the best example of the pharaoh's absolute authority over the people and resources of his domain. In a sense, these constructions were immense public works projects that helped to solidify the power of the state while also glorifying the memory of individual rulers. Contrary to popular view, they weren't built by slave labor, but by thousands of Egyptian farmers, put to work during the several months each year when the Nile floodwaters covered their fields. In all, some 25 pyramids honored the Old Kingdom's elite.

The Old Kingdom pyramids represent a remarkable engineering triumph and an enormous cultural achievement that inspired the civilizations that followed. Bear in mind that the stark structures we see along the Nile today were adjoined by extensive complexes of connecting causeways, shrines, altars, and storerooms filled with statuary and furnishings and ornamented with colorful friezes and carved stonework. The pyramids' slanting sides signified pathways to the sacred Sun. Worshipers flocked to them, paying reverence to the memory of the dead kings. The mortuary cult of



Egyptian Old Kingdom red slip pottery bowl

the pharaohs absorbed a large share of the work and wealth of Egyptian society.

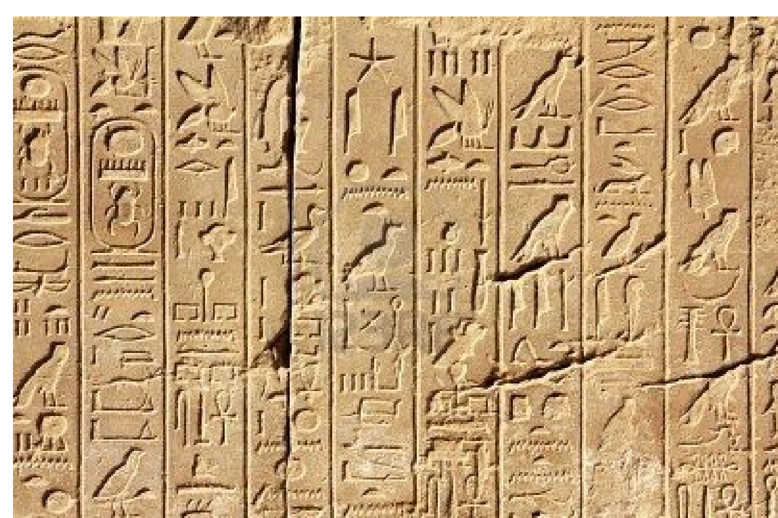
Later kings contented themselves with being buried in smaller, but still lavishly furnished tombs in the

Valley of the Kings, a cramped desert valley below a natural pyramid-shaped mountain near Thebes. Discovered in the 1920s, the treasurechoked burial chamber of the young pharaoh Tutankhamen, who died more than 3,300 years ago during New Kingdom times, is convincing evidence that dead royalty were not neglected even after the era of pyramids had passed. Near the same location, in 1995 archaeologists discovered another impressive New Kingdom tomb. Although looted long ago, rock-cut chambers prepared for many of the sons of Ramses II ("the Great") formed a vast underground mausoleum containing more than 130 rooms. The tomb, now called KV5, currently is being systematically explored and conserved.

Early pharaohs were godlike kings who ruled with divine authority through a bureaucracy of priests and public officials assigned to provinces throughout the kingdom. The pharaoh's power depended to a large degree on his assumed control over the annual Nile flood, and throughout the course of Egypt's long history, pharaonic fortunes tended to fluctuate with the river's flow. Most Old Kingdom pharaohs maintained their royal courts at Memphis, about 15 miles south Cairo.

Egyptians soon adopted a of present-day

complex pictographic script called hieroglyphics, a writing system that is Egyptian in form but possibly early Mesopotamian in inspiration. The earliest inscriptions are associated exclusively with the Egyptian royal court, as are other high-status products, such as cylinder seals, certain types of pottery, and specific artistic motifs and architectural techniques that also seem to be derived from beyond the Nile Valley. Advanced methods of copper working came into use as well, including ore refining and alloying, casting, and hammering techniques. Some of these proc

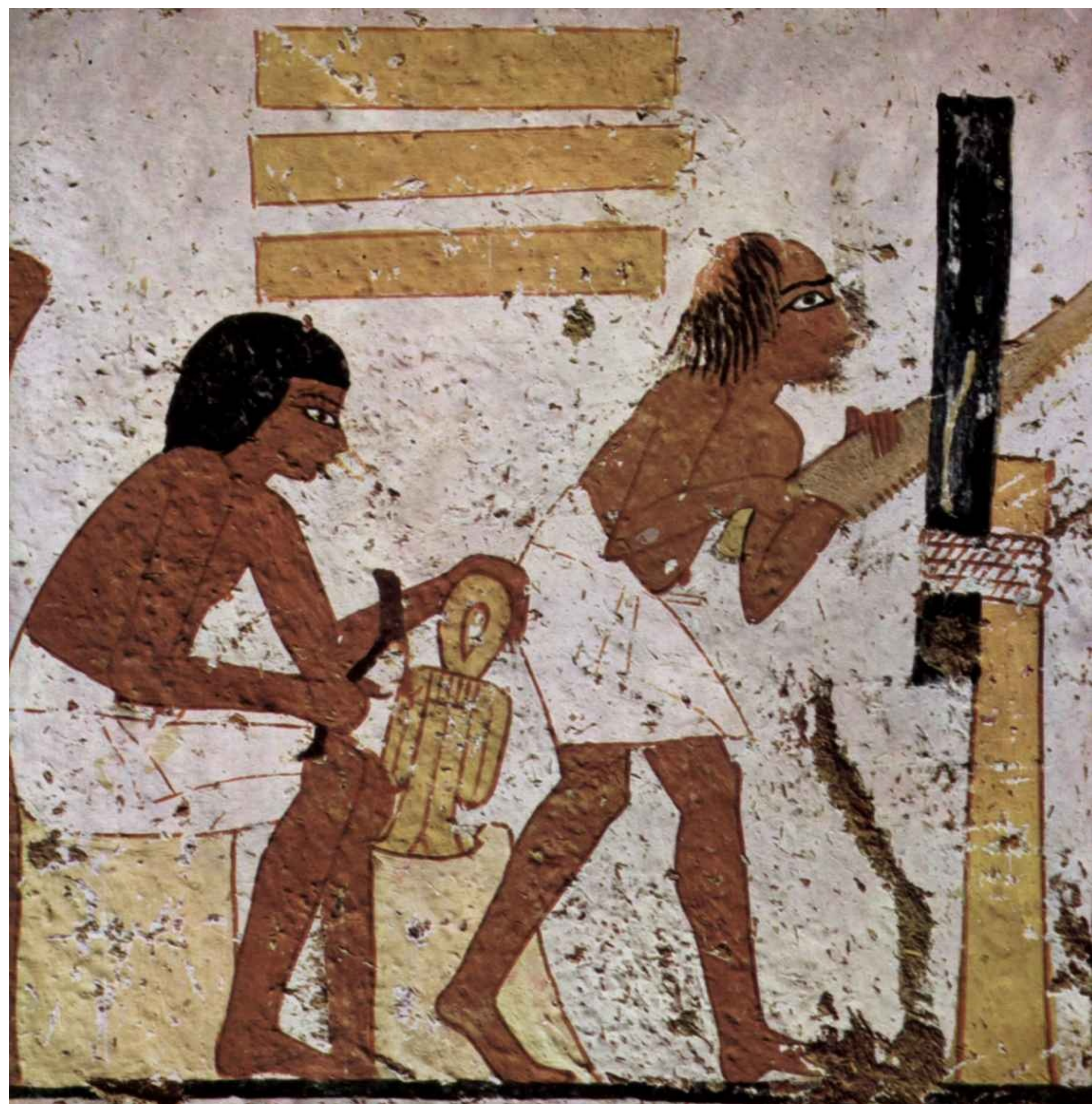

A sample of Egyptian hieroglyphic writing

esses likewise were invented elsewhere. An important by-product of copper metallurgy was faience, an Egyptian innovation produced by fusing powdered quartz, soda ash, and copper ore in a kiln. The blue-green glassy substance, molded into beads or statuettes, became a popular trade item throughout the region. It took hold as far as the Indus Valley.

Much of what we know of ancient Egypt's religion and rulers is due to the translation of countless hieroglyphic inscriptions. In 1799 at Rosetta, a small Nile delta town, French soldiers discovered a 2 1/2 - by - 2 1/2 foot stone bearing an identical decree engraved in three scripts, including Greek and hieroglyphics. Twenty years later, Jean-Francois Champollion finally succeeded in deciphering Egyptian hieroglyphic writing by using the Rosetta stone as a guide. Egyptian hieroglyphics are a combination of signs that represent ideas with other indicating sounds. Because hieroglyphics were

used primarily in formal contexts by members of the elite classes and bureaucrats (much like Latin in later times), their translation tells us much about pharaohs and their concerns, revealing less about the commonplace events and people of the era. In fact, archaeologists can read disappointingly little about daily life in Egypt's Old Kingdom period outside the major administrative and mortuary centers, where tomb scenes occasionally portray peasants at work in their fields or winnowing or grinding grain. Happily, later periods of Egyptian society are more fully documented.

Although nothing surpassed the original glory of the Old Kingdom period, Egypt proved remarkably resilient through the centuries, surviving foreign invaders such as the Hyksos and Hittites of southwest Asia, as well as frequent episodes of internal misrule and rebellion. Its pharaohs enjoyed periods of resurgence and revival until, in a state of decline and defeated by the Persians (about 2,500 years ago), Egypt fell into the Greek sphere under Alex



Egyptian depiction of a bronze saw

ander the Great and eventually came under the rule of Rome.

In contrast to Mesopotamia and the Indus Valley, few urban centers emerged in the ancient Nile Valley, and even the capital was of modest size. Egypt remained almost entirely an agrarian and rural culture, the vast majority of its citizenry comprising farmers and a few traders engaged in their timeless routines. Only in the immediate vicinity of Memphis and the sacred mortuary complexes along the Nile's west bank was Egypt's grandeur clearly evident.

The success of ancient Egyptian civilization came partly from its ability to adapt to the conditions of

the Nile River Valley. The predictable flooding and controlled irrigation of the fertile valley produced surplus crops, which fueled social development and culture. With resources to spare, the administration sponsored mineral exploitation of the valley and surrounding desert regions, the early development of an independent writing system the organization of collective construction and agricultural projects, trade with surrounding regions, and a military intended to defeat foreign enemies and assert Egyptian dominance. Motivating and organizing these activities was a bureaucracy of elite scribes, religious leaders, and administrators under the control of a Pharaoh who ensured the cooperation and



An Egyptian bronze mirror, ca. 1500 BC. Similar mirrors have been found in the Kulli culture of the Indus Bronze Age, dating some 800 years earlier

unity of the Egyptian people in the context of an elaborate system of religious beliefs.

The many Egyptians include construction techniques that facilitated the building of monumental pyramids, temples, and obelisks; a system of mathematics, a practical and effective system of medicine, irrigation systems and agricultural production techniques, the first known ships, Egyptian faience and glass technology, new forms of literature, and the earliest known peace treaty. Egypt left a lasting legacy. Its art and architecture were widely copied, and its antiquities carried off to far corners of the world. Its monumental ruins have inspired the imaginations of travelers and writers for centuries. A new-found respect for antiquities and excavations in the early modern period led to the scientific investigation of Egyptian civilization and a greater appreciation of its cultural legacy.

UnlikeMesopotamia,whereanoriginal river-valley basis to civilization ultimately gave way to the

spread of civilization throughout an entire region, Egyptian civilization from its origins to its decline was focused on the Nile River and the deserts around it. The Nile focus also gave a more optimistic cast to Egyptian culture, for it could be seen as a source of never-failing bounty to be achievements of the ancient the quarrying, surveying and thankfully received, rather than a menacing cause of floods.

Egyptian civilization may at the outset have received some inspiration from Sumer, but a distinctive pattern soon developed in both religion and politics. Also, unlike Sumer, Egypt moved fairly directly from pre-civilization to large government units, without passing through a city-state phase, though the first pharaoh, Narmer, had to conquer a number of petty local kings around 3100 B.C. Indeed Egypt always had fewer problems with political unity than Mesopotamia did. By the same token, however, Egyptian politics tended to be more authoritarian as well as centralized. In all its phases, Egyptian civilization was characterized by the strength of the pharaoh. The pharaoh was held to be descended from gods, with the power to assure prosperity and control the rituals that assured the flow of the Nile and the fertility derived from irrigation. Much Egyptian art was devoted to demonstrating the power and sanctity of the king. From the king's authority also flowed an extensive bureaucracy, recruited from the landed nobles but specially trained in writing and law.

Despite some initial inspiration, Egyptian culture separated itself from Mesopotamia in a number of ways beyond politics and monument building. The Egyptians did not take to the Sumerian cuneiform alphabet and developed a hieroglyphic alphabet instead. Hieroglyphics, though more pictorial than Sumerian cuneiform, were based on simplified pictures of objects abstracted to represent concepts or sounds. As in Mesopotamia the writing system was complex, and its use was, for the most part, monopolized by the powerful priestly caste. new material cheaper to manufacture and use than clay tablets or animal skins and allowed the proliferation of elaborate record keeping. On the other hand, Egypt did not generate an epic literary tradition.

MostEgyptianswerepeasantfarmers, closely regulated and heavily taxed. Labor requisition by the states allowed construction of the great pyramids and other huge public buildings. These monuments were triumphs of human coordination, for the Egyptians were not particularly advanced technologically. They even lacked pulleys or other devices to hoist the huge slabs of stone that formed the pyramids.

Egyptians ultimately developed a to write on, papyrus, which was
BRONZE AGE CIVILIZATION IN SOUTHEASTERN IRAN

During the end of the fourth and the beginning of the third millennium BC, a number of complex societies emerged in the borderlands of southeastern Iran. Represented by sites like Shahr-iSokhta in Siestan, Tepe Bampur in Iranian Baluchistan, and Tepe Yahya in Kerman. These societies had adequate access to water supplies or were on the trade routes between south and west Asia. Obviously, the environment of southeastern Iran played an important role in the economic development of these early sites. Additionally, the rapid socio-economic growth of Mesopotamia and the increasing demand for goods in this period led to a marked increase in the mining of semi-precious minerals in the area and what appears to have been a prosperous stone-carving industry. All of the societies of southeastern Iran developed along similar lines at this time (although some variation occurred based on the availability of local resources), and



Alabaster, steatite, and chlorite vessels, like this example from Shahr-i-Sokhta, show a high level of craft specialization. Discovery of many such stone vessels, which were pro

duced in the various workshops of southeastern Iran and exported, are sufficient evidence to suggest that these urban centers

were in close contact with one another and functioned as important production centers in the long-distance trade between east and

west.

potamia depended upon other civilizations in the east, such as the Indus Valley and the third millennium BC settlements in southeastern Iran, for metals, semi-precious stones, wood, and other resources.The rapid socio-economic growth of Mesopotamia and increasing demand for raw material and luxury goods thus facilitated the development of long-distance trade in southeastern Iran and supported craft specialization in this area. Fragments of carved chlorite vessels at Bampur, many semi-finished and broken fragments of elaborately carved vessels discovered at Tepe Yahya, and the presence of abundant fragments of alabaster at Shahr-i-Sokhta not only indicate a strong network of international trade between east and west, but also testify to the manufacturing character of the societies that produced them.

As an economic activity, trade motivates the productive potential of a society with increasing demand for goods. It seems that there were four primary territories engaged in long-distance trade: Badakhshan in central Asia was one of the centers of production; the Indus Valley was the source of several raw material and luxury goods; the settlements in Iran (especially in the southeast) acted as intermediaries and small sales markets; and the cities of southern Mesopotamia and western Iran



(Elam) acted as the large markets. In this scenario, the settlements in southeastern Iran acted not only

they formed a highly homogeneous cultural entity during the third millennium BC.

The Bronze Age societies of southeast Iran, which emerged during the end of the fourth and the early third millennium BC, experienced a rapid development. They exploited their locally available resources very effectively and established links with the civilizations of Elam and Mesopotamia in the west and the Harappan Civilization in the east, de



veloping advanced craft techniques that resulted in new luxury goods that were highly valued by the local elite. These societies not only functioned as a connection between the east and the west but also achieved a degree of urbanization and developed into prosperous redistribution centers.

Mesopotamiawasrichinagriculturalresources but not in wood and minerals. Thus, Meso


A decorative painting on a piece of pottery from Shar-iSokhta

as intermediaries and redistribution centers in trade but also as important centers of production.

The stone industry at Shahr-i-Sokhta demonstrates a shared technological tradition that links Shahr-i-Sokhta to Kelteminar settlements in Choramisa and Harappan settlements in the Indus Valley. Semi-precious stones like lapis lazuli and turquoise, and marine products such as shells and sharks' teeth, were the most important materials processed at the settlement. The presence of abundant fragments of these stones indicates a strong trade network in which Shahr-i-Sokhta assumed the function of a production area to which raw materials were brought, and from which finished materials were distributed. Many geometric stamp seals or seal fragments, countless beads, and several vessels carved from the soft green magnesium silicate, chlorite, which had a broad range of uses, as well as prestige objects have been discovered at Shahr-i-Sokhta.

Cultural contacts between the Bampur Valley and other regions can be illustrated through ceramics, as well. For example, the pottery of certain phases provides evidence of cultural contacts with sites in southern Sistan and can be related to pottery at Mundigak in southeastern Afghanistan. In addition, perforated vessels found at Bampur are closely comparable to vessels from the Kulli-Mehi culture of Makran in the Greater Indus Valley. Many chlorite vessels have been discovered from the Kulli and Indus cultures as well as Mesopotamian in an Early Dynastic context, indicating contacts between these regions.

Hemmed in between deserts and mountains, the potential for growth was limited for these early sites and many settlements were abandoned during the first centuries of the second millennium BC, just as the Indus Civilization in the east and the Mesopotamian in the west were starting to decline. In such marginal areas, there must always have been a delicate balance between the advantages of increasing complexity and the vast investment necessary for its support. Indeed, when collapse or decline occurs due to internal or external factors, investment in complexity, such as the use of surplus to support full-time craft specialists, scribes, or elites, begins to yield a declining marginal return. If these marginal returns decline further, the benefits of complexity for the society as a whole diminish, complex traits are frequently sacrificed, and the settlement reverts to a lower level of socio-economic integration.

The decline in trade between Mesopotamia and the Indus Valley affected the intermediary settlements in southeastern Iran. Shahr-i-Sokhta was cut off from long-distance trade when maritime routes

replaced the overland routes. Tepe Yahya and Tepe Bampur, however, remained active until the full decline of trade between Mesopotamia and the Indus Valley occurred. It was this later occurrence that finally caused the collapse of complex societies in southeastern Iran in the first half of the second millennium BC (11).

BRONZE AGE CIVILIZATIONS OF CENTRAL ASIA

The Bronze Age civilization in Central Asia was not only contemporary with the better known civilizations of the Indus Valley, southern Iran and Mesopotamia, but closely linked to them as well. It is not a coherent civilization in the sense as the Indus, Mesopotamian, or Egyptian civilizations are. It comprises of a number of ‘civilizational oases’ mainly located at the southern borders of Turkmenistan and northern Afghanistan. Not much is yet known about these pockets of civilization but it is assumed that they shared quite a bit in common and can be treated as localized manifestations of a common culture.

Central Asia is dominated by two great riverine systems that drain the Hindu Kush: the Syr Darya and the Amur Darya. The Amur Darya, referred to as the Oxus River in classical antiquity, flows from east to west through the region the Greeks called Bactria. These riverine environments and their numerous tributaries set the conditions for agricultural development within numerous oases. The distinctive nature of the ecological setting that characterizes the oasis/steppe environment of Cen



Fig. 8. Terracotta model of a cart drawn by a camel (partially reconstructed). Altyn-Depe, excavation 9, horizon 2 (ca 2200 BC).



Fig. 9. Terracotta model of a cart (partially reconstructed). Southern Hill of Anau (the last quarter of the 3rd millennium BC). Archives of the Institute for the History of Material Culture, Department of Photography, negative No. III 9579, excavations by R. Pampelli (1904).

Terracotta model of a cart from Anau in southern Turkmenistan (late third millennium BC)

tral Asia defines the cultural aspects of the central Asian Bronze Age.

Much uncertainty occurs over what to call this ‘Central Asian civilization'. 'Oxus Civilization' had a very brief moment of vogue, in obvious reference to the other great riverine civilizations of the Nile, the Tigris-Euphrates and the Indus. But this quickly fell into disfavor by archaeologists: first over a lack of agreement, as we have seen, over what exactly constitutes a 'civilization', and second because much of it (around Merv in Turkmenistan, for example) was not actually located on the Oxus. Hence,

the term ‘Bactro-Margiana Cultural Complex', or 'BMAC for short has been coined. Of course, a lack of writing or even of cities rivaling Ur or Memphis in Mesopotamia or Mohenjo-daro and Harappa in the Indus Valley has never stopped the ancient Andean, Central American or Bronze Age European cultures being regarded as 'civilizations'. And the existence of many fine upstanding Indus sites away from the Indus River, or Mesopotamian monuments not washed by the waters of Babylon, has not made them any less a part of the Indus or Mesopotamian civilizations, respectively. The term 'Oxus Civilization', therefore, seems appropriate.

Although the ‘Oxus civilization’ emerged mainly in the north of Hindu Kush, its orbit extended to major sites further south, such as Mundigak in Afghanistan and Shahr-i-Sokhta in south-eastern Iran. Further afield, the civilizations of both Elam in the south Iran and the Indus Valley to its southeast also came within this greater orbit. Hence, there is considerable hesitation in defining the exact geographical limits of this Central Asian civilization. There is also still doubt as to whether the emergence of the various earlier 'cultures' of Central Asia into something more homogeneous and sophisticated in the Bronze Age can really be called a true 'civilization'. On the one hand it bears all the hallmarks of a 'civilization': monumental architecture, sophisticated irrigation, agriculture and engineering, a stratified society, structured organization, interregional communication and many of the other characteristics of civilization. On the other hand



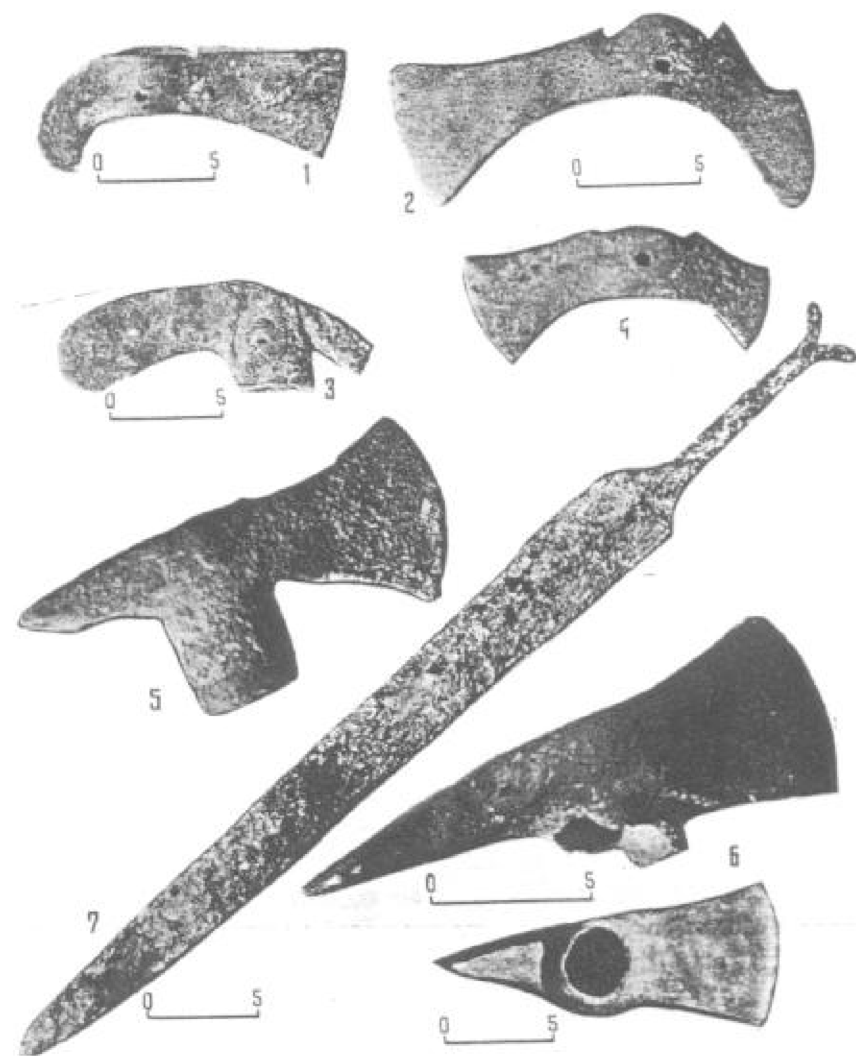
Seated Female Figurine, a “Bactrian Goddess or Prin

Seated Female Figurine, a “Bactrian Goddess or Prin 1500 B.C. Sculpture from Chlorite and limestone (***Los Angeles County Museum of Art*****)**

there is no writing and there is no consensus whether Altyn, Namazga, Mundigak, and the other large-scale settlements can be called true 'cities'.

The first half of the third millennium in the Oxus region can be called 'proto-urban'. It was a vital and energetic period: there is the earliest evidence for large towns and fortifications, monumental architecture suggests cults and social stratification, and there is abundant evidence for longdistance trade. The period corresponds to the Sumerian Early Dynastic in Mesopotamia and Early Harappan in the Indus Valley. Monumental architecture is viewed as evidence for early state formation, as it implies the existence of an elite, of collective work, and of social stratification - all requirements for a state. Monumental buildings are usually on high ground in the centre of settlements, and are constructed of mud-brick.
Comparisons can be drawn with the emerg e n c e o f m o n u m e n t s e l s e w h e r e - f o r example at Shahr-i-Sokhta in south-eastern Iran, Altyn in southern Turkmenistan, and Tureng Tepe in north-

eastern Iran. Elaborate facades incorporating pilasters at Mundigak (southern Afghanistan) and Dashli in northern Afghanistan. Metallurgy becomes more sophisticated with increased experimentation in casting and alloys. Pottery is almost entirely wheel-made and the decoration shows a uniformity between the Quetta Valley in Pakistan, sites around Kandhar in southern Afghanistan, and sites in Turkmenistan to the northwest. Professional potters worked in specialized parts of settlements using sophisticated kilns. Increasingly sophisticated agricultural techniques developed in the oases, with long distance irrigation canals up to three kilometers long and artificial reservoirs. The figurines and pottery decoration show increasingly rich artistic expression and refinement. International communications become increasingly more sophisticated, developed and tightly-knit. This is seen most dramatically at the site of Shortughai



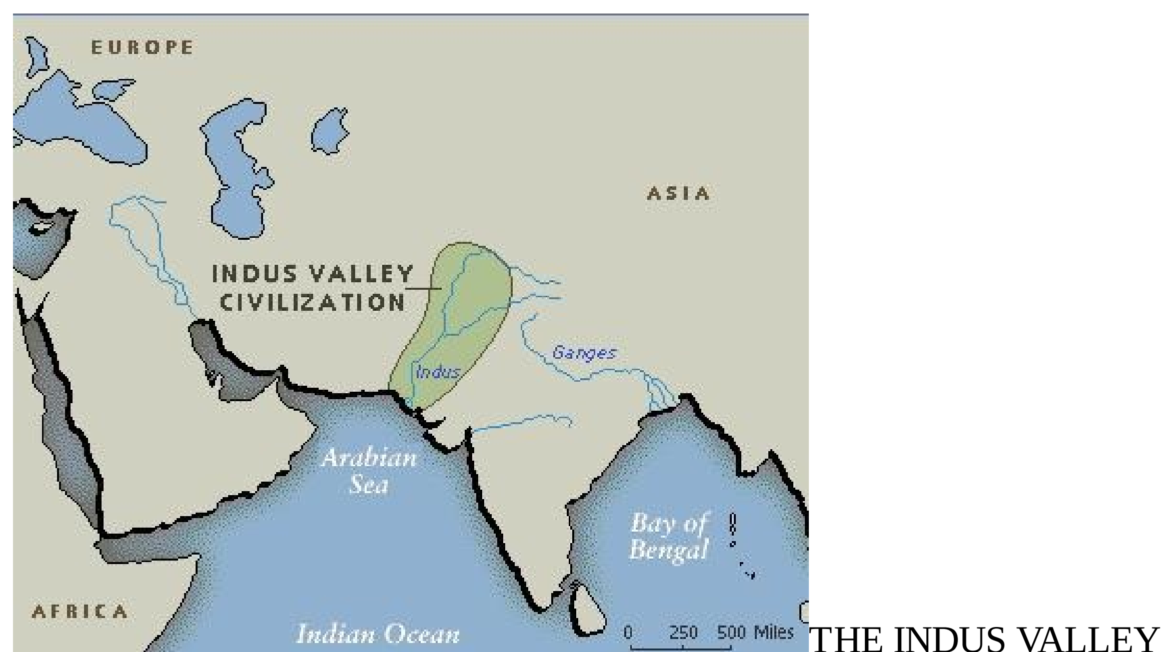
Copper and bronze tools from central Asian Bronze Age

on the Oxus River in Afghanistan, which appears to have been a colony built by people from the Indus Valley at the end of the third millennium BC.

These characteristics occur all over the area of Central Asian borderlands roughly at the same time, between 2600 and 2000 BC. The height of the Bronze Age is from the end of the third millennium to the first quarter of the second millennium. The question posed, therefore, is whether all of this region formed a part of a single cultural region? Indeed, there has been speculation that the contemporary civilizations of Central Asia, the Indus Valley and southeastern Iran were all a part of one single civilization, probably speaking a common language.

There was a decline in the second millennium round about 1700 BC, with general depopulation all over the region. This is seen throughout, at the Indus Valley and north-eastern Iran as well as in Afghanistan and southern Turkmenistan. This has been interpreted as a 'transformation of culture rather than a break'. It is possibly related to the arrival of new nomadic groups on the steppes - perhaps the first Indo-Iranians? This decline at the end of the Bronze Age in Central Asia is a part of many movements and the arrivals of new peoples, mingling with the older sedentary populations. But there is no evidence for destruction or violence - no 'IndoAryan' invasion.

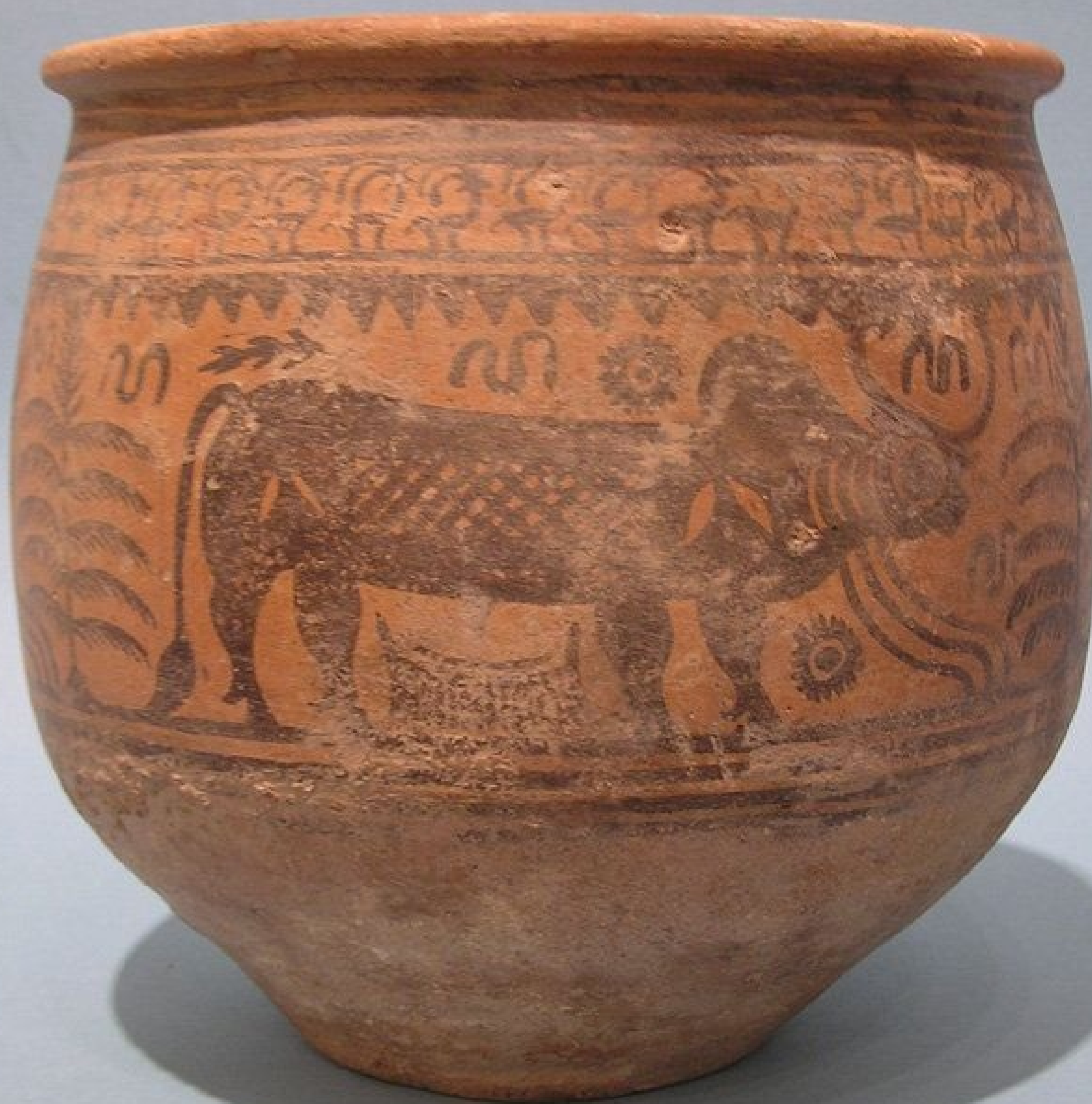
The Bronze Age civilization of central Asia and Afghanistan is slowly coming in light. These pockets of incipient or actual urbanization are relatively small and few in number. They are also poorly documented. A consolidated account is available in *History of Civilizations of Central Asia* where Masson (6) describes the development of agricultural communities and their transition to the Bronze Age settlements in Central Asia and Toci (7) discusses the Bronze Age in Iran and Afghanistan. Logically, the civilizational developments in these areas should be more relevant to the Indus Civilization than those of Mesopotamia or Egypt. But since all of these regions lagged behind the Indus Valley in the development of urban societies, they are more relevant to the Late-Harappan cultures in Pakistan. Irrespective of the question of contemporaneity, the Harapan people were in as close contact with the inhabitants of these societies as they were with the peoples of the Gulf.



THE INDUS VALLEY

As the first great pyramids rose beside the Nile, a collection of urban settlements that dotted a broad floodplain far to the east was forming into the Harappan, or the Indus Civilization. Starting from the fifth millennium BC, for seven centuries, between about 2,500 and 1,800 BC, the banks of the Indus River and its tributaries in what is now Pakistan supported at least five primary urban centers, each with a population numbering in the tens of thousands. Many hundreds of smaller farming villages were socially and economically, if not politically, linked to these central places. This book is concerned with the flowering of this material culture.

The discovery of large urban centers in the Indus Valley were an utter surprise to the students of ancient history. Rather than emerging from a



A painted Harappan vessel, third millennium BC

long, slow period of gradual and constant cultural growth leading to a slowly emerging pattern of urbanization and social complexity, the Indus Civilization seemed to have resulted from a very short period of transformation and since it seemed to have emerged suddenly, it was tacitly agreed that it was merely an import from the West, that is, an offshoot of the Sumerian civilization described above; some early archaeologists even named it the “IndoSumerian” civilization. No doubt, several food producing sites, mainly in Baluchistan, were already coming to light, they were assumed to be relatively recent, implying a short period of gestation (8). This gestation period was later shown to have been very long and deep.

The material culture of the Indus Civilization has been well researched during the past century

although not to the extent the Mesopotamian and Egyptian civilizations have. The discovery of the remains of Mohemjo-daro in 1922 raised immense interest world-over because of its extraordinary urban character. Since then the archaeology of the Indus Civilization has been growing, both in terms of geographic frontiers and cultural dynamics. In the post-Independence period, this study has been occupying a paramount place in the archaeology of South Asia and the last few decades, in particular, have witnessed excavation of scores of Indus sites, bringing to light the most exciting results. Intensive explorations and excavations of several sites both in India and Pakistan have caused a tremendous explosion in knowledge, facilitating a far better understanding of the fundamentals of its origin, its efflorescence and of its ultimate end. Archaeologists in these two countries, either independently or in collaboration with western scholars, have launched multidisciplinary investigations to reconstruct the spacio-temporal framework of this civilization. The radiocarbon determinations and the evidence of the early food-producing cultures within the Greater


Seals and inscribed tablets from the Indus Valley, mid third millennium BC

Indus Valley have put the civilization in the perspective of indigenous origins. A vast body of cultural data, brought out from recent excavations, have accompanied paradigms shifts in the study, necessitating concomitant changes in the projection of this civilization.

While we know quite a bit about the economic and cultural life of Mesopotamia and Pharaoh's Egypt through their writings, we do not have such a fortune in the case of the Indus Civilization. No extensive written material has survived and whatever rudimentary written word is available, it cannot be deciphered. All what we have is the archaeological evidence in the form of architecture, artifacts, pottery, painting and decorative styles on pots, stone and bronze tools, and the like. Even here, we did not have much to go on till recent times. Thus, in comparison with these two Bronze Age civilizations, we are at a disadvantage in understanding the Indus Civilization on its own. In order to surmount the difficulties of an incomplete material and written record, we must refer to betterknown cultures of these two regions. In fact, since its discovery, the Harappan Civilization has been interpreted and understood against the background of other contemporary Bronze Age civilizations, on which much written evidence is available.

Given what we know about Egyptian and Mesopotamian literacy, for example, we may infer that in ancient Pakistan there could not have been total literacy, neither would the knowledge of reading and writing have been the secret preserve of priests; that a tax on harvest produce was unlikely; that polities could have been organized as citystates. Such parallelisms are based on what can be reconstructed of the structure of a Bronze Age society elsewhere. This parallelism is, however, not perfect; the Indus Civilization has some peculiarities which cannot be explained by looking at the social structures of Mesopotamia and Egypt. For example, we do not see the existence of kings and

temporal priests, and we do not find the remains of their palaces and temples. The existence of their tombs eludes us too. The Indus Civilization differs from the above two Bronze Age civilizations for the absence of a war mongering trait. Compared to them, the Indus Civilization, in the words of Jane McIntosh, seems to be a ‘peaceful realm’. Another characteristic that does not go hand in hand with that of Mesopotamia and Egypt is the remarkable constancy of the Indus Civilization: it looks as though nothing changed throughout its existence of 700 years or so. Thus, when we study the Indus Civilization, we need to make certain allowances for the accommodation of these differences, some of which are rather fundamental. We need to reach our own conclusions and the known facts of the civilizations of Mesopotamia and Egypt are of not much help to us in explaining some aspects of the Indus Civilization.

As stated in the lars chapter, the major centers of the Indus Civilization lie within two major river systems, the Indus and the Ghaggar-Hakra Rivers. The Indus, one of the great rivers of Asia, originates in the shadow of the Himalayas and courses through a vast dry zone before emptying into the Arabian Sea. The Ghaggar-Hakra straddles the two countries of Pakistan and India. It is now dry. Opinions differ about the past strength of the Ghaggar-Hakra river. While some earth scientists would vouch for its past majesty, some others would maintain that it has always been a minor watershed of the Siwalik hills to the north, and its water soaked up by the sands of Cholistan before it had the chance to meet the India Ocean.

It appears that the peoples of the Indus Civilization were relative newcomers to the Indus plains. Their ancestors cultivated the higher valley margins to the west at sites like Mehrgarh by 8,000 years ago. Farming and herding, along with regional trade, sustained village life from an early period in these uplands. Around 5,500 years ago, farmers began to populate the Indus floodplain itself, possibly seeking more productive cropland or better access to potential trade routes for valued copper, shell, and colorful stones. Occupying slight natural rises on the flat landscape at places like Kot Diji in Sindh, they laid out fields for their vegetables, cereals, and cotton on the deep alluvium. As the new settlements grew, farmers diverted part of the river's flow into rudimentary canals to irrigate their fields, the signs of which have already been obliterated. They also constructed massive retaining walls or elevated platforms to protect their homes from the devastating effects of seasonal floods.

Some of these settlements prospered and grew. By 4,600 years ago, several large near-urban centers hugged the river. Why had people accustomed to living in small farming communities congregated in these cities? Possibly an increased threat of flooding along the river, brought on by extensive deforestation and other poor farming practices, simply forced people to come together in building and maintaining more levees and irrigation systems. An alternative hypothesis proposes that trade was the "integrative force" behind Indus urbanization (9). A few entrepreneurs may have fostered exchange between the valley settlements and the uplands, promoting resource development, craft specialization, and product distribution to stimulate and reap the economic benefits. As commerce began to payoff, other changes, including urbanism and social stratification, shopkeepers, and foreign transformed Indus society even more.

As busy centers of craft production and trade, the cities prospered along the great river and its tributaries. Workshops in different neighborhoods turned out large quantities of wheel-thrown pottery, millions of burnt bricks, cut and polished stone beads and stamp seals, molded figurines, and work in copper, tin, silver, gold, and other metals. Merchants' scales used standardized stone cubes of precise weight to facilitate exchange transactions. The Indus itself became a commercial highway for

boats loaded with goods moving up and down the river or destined for Persian Gulf ports. Carts, too, carried the colorfully dyed cotton cloth, pottery, shell, and precious metal goods overland to Delmun and probably to Mesopotamia.

So far, archaeologists have carried out extensive excavations at some of the major cities and a few of the smaller contemporary agricultural and pastoral villages. The largest Indus sites excavated so far are Mohenjo-daro and Harappa, which flourished between 2,600 and 1900 BC in present-day Pakistan. Raised on massive brick terraces above the river's flow, these cities were carefully planned, using grids of approximately 1,300 by 650 feet for the residential blocks. Although these large sites certainly reveal social complexity and a certain degree of central control, the Indus Civilization lacks grand picturesque ruins of the type found in Egypt and Sumer. You won't find sumptuous palaces or monumental religious structures here. Their absence may suggest a basic feature of Harappan society, whose people were less focused on glorifyattracted craftspeople,

traders, all of whom ing their individual rulers. Richard H. Meadow, who excavated at Harappa for several seasons, describes this civilization as "an elaborate middleclass society". Gregory L. Possehl (10), another archaeologist with decades of Indus civilization research experience, draws a similar conclusion and describes it as a socioculturally complex civilization that lacks evidence of the state form of political organization. Possehl (10) argues that the criteria by which the state is archaeologically identified - a hierarchy of social classes, kingship, state bureaucracies and the monopolization of power, state religions, and so forth - aren't readily identifiable in the archaeological remains of the Indus civilization. This difference - that of a highly successful, complex society based on a form of political organization other than the state - sets the Indus Civilization apart from that of Egypt and Mesopotamia and makes it clear that we still have a lot to learn about this extraordinary development in South Asian prehistory.

BothMohenjo-daroandHarappaencompassed a public district and several residential areas. Mohenjo-daro's "great bath" lies near what has been interpreted as that city's government center - a complex that also included elite residences and a large assembly hall, all of which were set on massive mud-brick and burnt-brick platforms. Water was ideologically important to Indus peoples, and they may have used features like the great bath for ritual cleansing as a part of worship. Nearly 700 bricklined wells have been recorded by archaeologists at Mohenjodaro, and similar, although less conspicuous, features are found at other Indus sites.

In both cities, homes brick-walled dwellings that streets and alleys to spacious multistoried houses with interior courtyards. What has been proclaimed as the world's first efficient sewer system carried waste away from these densely packed dwellings, many of them equipped with indoor toilets and baths.

Indus Civilization is usually subdivided into Early, Mature, and Late periods; the Early being the formative period, the Mature being the period of full urbanization between about 2600 and 1800 BC, and Late being its declining years. The origins are rooted deep in the prehistory of the Afghan-Pakistan borderlands centered in the hill country of Baluchistan, with various stages of hunting-gathering and early agricultural societies over many thousands of years, slowly evolving into a complex, urban society. Like other Bronze Age civilizations, the Indus Civilization ultimately declined and came to an end. Its decline seems to have been as rapid as its ascent. Without written records or any archaeological evidence of invasion or revolution, we can only guess what caused its

demise. Most likely, its decline was brought about by a combination of circumstances, not all of which are yet fully understood.
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Chapter 3.

Discovery of the Indus Civilization

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it was revolutionary. Hither to fore the civilization in-+);! R5+5885! 50%!T)#$0F)%5+)!&0!+58&%! '1(($''&)09!! /0! .#$! ;$50.&;$! .#$!&0.33(.153!where peacocks could be heard and treasures like the subcontinent was believed to begin with the5..$0.&)0!)-!.#$!5(5%$;&5!+$;5&0$%!-)(1'$%!)0!.#$!E$5+!U5'.!50%!<$-)+$!.#$!#&'.)+&(53!gold, tin, and carnelian procured. The texts speak of&;83&(5.&)0'!)-! T)#$0F)%5+)! 50%! R5+5885! <$(5;$! (3$5+:! .#$! $%1(5.$%! (35''! 6).!
Aryans, and the Vedas were thought to be the start battles, acquisition of booty, diplomacy, and other

&;;$+'$%!&0.)!.#$!(&*&3&45.&)0'!)-!T$')8).5;&5!50%!U6,8.!5'!.#$,!C$+$!&0!.#$!C)+3%!)-!
of the subcontinental history. Suddenly and unex

pectedly, a grand civilization was unveiled and its cultural roots traced back to several millennia be fore the appearance of the Aryans or the Vedas on the scene. In fact, contrary to their credit, it ap peared that the Aryans, or some folks like them, could have been the instrument of the destruction of this thriving civilization in their wake. In this respect, the discovery of the Indus Civilization and the exca vation of Mohenjo-daro was a shock to the Euro pean intelligentsia as well as to the Vedic scholars of India. It took some time to recover from this shock and absorb the implications of the discover ies which were forthcoming from Harappa and Mohenjo-daro in rapid succession. In the meantime the intellectual attention of the academia remained focused on the Near East and before the historical implications of Mohenjo-daro and Harappa became
ventures as well as the maritime and overland routes by which they were obtained. Seaworthy boats from Mesopotamia sailed the Persian Gulf, scheduling travel in accordance with annual monsoons and the prevailing winds and stopping at ports where sweet water was available.

Overland travel involved traversing through vast arid regions and mountainous zones either on foot or by animal-drawn carts. These references are rather short-lived, however, and they disappear from the Mesopotamian documents by 1700 B.C. In later periods, references to Meluhha are to a different region altogether, thus putting an end to these early glimpses of these people and their land, which have been traced back to the Indus Valley and its people. Magan or Makan was another region spoken of in these texts. This region was identified by historians with the coast of Makran and the northern areas of Oman. The half-way station, or, more accurately, an interport station in the Persian Gulf, named in the text was Dilmun and this was traced to the island of Bahrain.

Western scholarship on the history of the region began in the seventeenth century when European merchants incorporated the East India Company for purposes of trade in east Indian spices. The company had gained permission from the Mughal Emperor, Jahangir, to establish a mercantile "factory," and trading posts were built along the east and west coasts of India. Europeans were

attracted to the region for its economic opportunities, but many also had scholarly interests. Various voluntary associations were founded based on their historical and connected to these associations were not part of the government.

Founded in 1784, the Asiatic Society was the earliest. It was followed by the Bombay Literary Society (1804) and the Literary Society of Madras (1812). Most members were East India Company employees, and their overall purpose was to make India “legible" (10). Studies initiated by members of the societies differed from the works of travel writers and earlier histories that were based on firsthand observations. Instead, their focus was on reading and interpreting works written in Sanskrit and other South Asian languages. Their scholarly works "claimed a superior authority ... [because they] did not merely see the outer person but had access to the mind and intentionality of the Asian, the inner person" (10). Viewed from that perspective, archaeological remains (material culture) were secondary and useful primarily as complements to textual studies.

Exploration that led to archaeological discoveries was left to the patronage of civil authorities and military officers. A major effort during the early nineteenth century involved survey work designed to document the extent of Indian territory and to collect a variety of data useful to the colonial enterprise. Surveyors produced maps that showed geographical features and documented river systems and geodetic observations. They also collected botanical and geological specimens and measured distances between locations for mapping purposes, and recorded local customs. Surveyors often followed other interests and accumulated large collections of manuscripts, drawings, and antiquities, subsequently publishing detailed "plans and measurements of monuments and sites" (11).

Charles Masson’s Discovery of ‘Sangala’: The story of discovery of the Indus Civilization actually begins in 1829 when an antiquarian from the state of Kentucky in America, by the name of Charles Masson, visited the huge mounds adjacent to the village of Harappa, near an abandoned course of the River Ravi in Sahiwal District of the Punjab. He was in the employment of the British Army of Bengal, which he apparently deserted to travel to the western borderlands of British India. He literary pursuits. Although closely the British colonial administration, confused the ruins of Harappa with the city of Sangala, the capital of King Porus, who fought a fierce battle with Alexander. He writes:

“A long march preceded our arrival at Haripah through jangal of the closest description. East of the village was an abundance of luxuriant grass, where, along with many others, I went to allow my nag to graze. When I joined the camp I found it in front of the village and a ruinous brick castle. Behind us was a large circular mound, or eminence, and to the west was an irregular rocky height, crowned with remains of buildings, in fragments of walls, with niches, after the eastern manner. The latter elevation was undoubtedly a natural object; the former being of earth only, was obviously an artificial one. I examined the remains on the height, and found two circular perforated stones, affirmed


Charles Masson

to have been used as bangles, or arm-rings, by a faquir of renown. He has also credit for having subsisted on earth and other unusual substances, and his depraved appetite is instanced in testimony of

his sanctity. The entire neighborhood is embellished with numerous pipal trees, some of them in the last stage of lingering existence, bespeaking a great antiquity, when we remember their longevity. The walls and towers of the castle are remarkably high, though, from having been long deserted, they exhibit in some parts the ravages of time and decay. There was ample room on the summit to receive the party and the horses belonging to it. It was impossible to survey the scene before us, and to look upon the ground on which we stood, without perceiving that every condition of Arrian‘s Sangala was here fulfilled, the brick fortress, with a lake, or rather swamp, at the north-eastern angle; the mound, protected by a triple row of chariots, and defended by the Kathi before they suffered themselves to be shut up within their walls; and the trench between the mound and fortress, by which the circumvallation of the place was completed, and whence engines were directed against it. The data of ArrianHarappan Civilization - The material culturefrom the King of England to Ranjit Singh, the power

are very minute, and can scarcely be misapplied to()*+,-$./%,0%12$%3456*%7)-)8)9"1),4ful king of the Punjab. In the course of this journey,!

Hariupa, the position of which also perfectly coin
cides with what, from inference, we must assign to
fulfilled, the brick fortress, with a lake, or rather
Sangala.”swamp, at the north-eastern angle; the mound, pro
Burnes visited the site of Amir (in Sindh) and was the first man to publish it as a prehistoric archaeo
enlisted in the Army of the East India Company unlogical site. While in the Punjab, Burnes went to

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Harappa with Sangala is incorrect, but it was somesess the "viability for future movements" of the

the Kathi before they suffered themselves to be
thing that Masson never gave up, and the search
for Sangala continues to this day. On the other

the mound and fortress, by which the circumvalla

tion of the place was completed, and whence en
able energy, with a deep interest in antiquarian sci
gines were directed against it. The data of Arrian
ence. He made a sound contribution to the history

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up within their walls; and the trench between and provided additional details to Masson's observisit>!4+ $%+ 1"&/+ ?%,5.#@)<+ A%+ >!4+!#5.!")+B!/%4+ C%>34*+ 0&",%+&,+ 9%0".!")+ DE*+ DFGG+ 3,+ European to

hand, Masson was an insightful man of considerHarappa and to publish it as an archaeological site.vations. He noted that parts of the ancient city had been built of baked brick, and he commented on the
Lt. Alexander Burnes made an historic journey up
ongoing destruction of the site brought about by

ander Burnes, the second European to visit Harappa and to publish it as an archaeological site. Alexander Burnes made an historic journey up the Indus river. The ostensible reason for his voyage was to deliver a gift of five horses and a carriage

are very minute, and can scarcely be misapplied to9&&5+!,-+"%H%,'345%-+3,+5$%+;"/)+&1+5$%+I!45+J,-3!+K&/2!,)+.,-%"+!+1!'4%+,!/%<++

of Pakistan‘s archaeology, and a number of prehis

Hariupa, the position of which also perfectly cointoric discoveries in the Pashtun country and Af cides with what, from inference, we must assign to ghanistan decidedly go to his credit. Possehl dis

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'()*+,$-.%+/%01$%2345)%6(,(7(8"0(+3!'()*+,$-.%+/%01$%2345)%6(,(7(8"0(+3powerful king of the Punjab. In closes that Massaon was not in fact Masson, nor Burnes referred to as "perfect chaos" (7).
Later,journey,!"#$%#&'( )*+(,-.)(/&%#-&(0-#$1-2(3456(7-4-8*#( )5((the course of this !"#$%#&'( )*+(,-.)(/&%#-&(0-#$1-2(3456(7-4-8*#( )5(brick robbing on an even grander scale would prove
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9-*54+((:((;5*&(1-.(#&(8*-4'+(53()*+(.5")*+4&(.+8)#5&<(*#.(
Burnes visited the site of Amri
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to be a catalyst for continuing interest in Harappa. !45)*+4(53( )*-)(#&( )*+(="&>-!<(3456(?"$)-&(&54)*1-4%.@(

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the construction of a major railway system designed

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!"#$%&'("%)+,-%./***#6-'#&-)#A+(-48*-+5$5'#.)(53(H5")*+-.)(I.#-<(85J#+.(Burnes’ observations on the site do not vary

3456()*+.+(6+65#4.(#&(*#.(!55B(significantly*!"#$%&'("%)*+,-*

%./those company's army. He arrived at 435%<+C5<+;'%N!,-%"+O.",%4+/!-%+!,+$345&"3#+P&.",%)+.2+**



from of Masson. He writes: Harappa in 1831 (7) and pro

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1+4+()4"+<()*#.(4"#&+%(8#)2<(!"#$)(53(!4#8B.<(15"$%(3546(-(noted that parts of the ancient sive,

and the place, which has been built of bricks,

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brick, and he commented on the ongoing destruc
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53(ruined citadel on the river side of the town; but oth*"'+<(%".)2(65"&%.<(J-4)(53(1*#8*(*-%(
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erwise Harappa is a perfect chaos, and has not an

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repair their homes was a local village practice A#$$-'+(53(K-4-JJ-(5&()*+(.#)+@(;5*&(6".)(*-A+
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J$"&%+4+%(-.(4")*$+..$2(-.(G4-&*6#&-!-%(*-%(!++&<(-&%()5%-2()*+()4-#&.(4"6!$+(5A+4(-(5!)-#&#&'(!-$$-.)(354( )*+( )4-8BM(-(J4+*#.)54#8(8-J#)-$(53( )*+(="&>-!<(K-4-JJ-<(1-.(5&+2.0'34$+35+!4+!+2"%$345&"3#+!"#$!%&'&(3#!'+435%<+8$3'%+tion fixes the fall of Harappa at the same period as *"&%4+%(6#$+.(53($#&+($-#%(5&(-(.+8"4+(35"&%-)#5&(53()*#4%:6#$$+&&#"6(!4#8B:!-).@(N"4#&'(as "perfect chaos" (7). Later, brick robbing on an

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its ruins to the vengeance of God on Harappa; its
)*+(!4#8B:45!!#&'<(-&)#O"#)#+.(53(A-4#5".(B#&%.(1+4+(35"&%(-&%(.56+(53()*+6(B+J)(!2()*+
(continuing interest in Harappa. In spite of the visits governor, who claimed certain privileges on the
9$3$-"7%6533(3#1":
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(of Masson and Burnes and their documentation of marriage of every couple in his city, and in the

,&5+ 6!")+ 43(,313#!,5')+ 1"&/+ 5$&4%+ &1+ =!44&,<+ A%+9$3$-"7%6533(3#1":(of a major railway became a Mohammedan*51+A+4<(+&% (*+4+@(I)(7-4-8*#<(;5*&(1-.(-(6+6!+4(53(later period, Harappa

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system designed(
town; and there is a tomb of a saint of the faithful,
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to link parts of
51+A+4<(+&%(+4+@(I)(7-4-8*#<(;5*&(1-.(-(6+6!+4(53(the region failed eighteen feet in length, the assigned, but fabulous,)*+4+@(K#.(&-6+(1-.(P"&&#&'*-6@(L*+&(*+(4+)#4+%()*+(4"$#&'(+$#)+<(53(1*#8*(stature of the deceased. A large stone of annular

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to recognize the
P566-&%#&'(Q33#8+4(53( )*+(9#&+(0+'#6+&).(.)-)#5&+%(form, and a huge black slab of an oval shape, which

S+&+4-$(53(I48*-+5$5'#8-$(H"4A+2(53(T54)*+4&(/&%#-@()*+4+@(K#.(&-6+(1-.(P"&&#&'*-6@(L*+&(*+(4+)#4+%(3,'!,-+ 1&"+ 1&."+ /3'%4+ 5&+ %N!/3,%+ 5$%+ ".3,4+ &1+ !,+=6.4$*%S+&+4-$(P"&&#&'*-6<(-$)*5"'*(&5)(-&(-48*-+5$5'#.)(!2(3456(-8)#A+(.+4A#8+(#&(CDRC(*+(1-.(-JJ5#&)+%(N#4+8)54:)4-#&#&'<(#.(5&+(53( )*+('4+-)+.)(3#'"4+.(53(&#&+)++&)*(this departed giant, and to have been converted "%/!3,4+was he from Kentucky. He was actually

James !,#3%,5+c o n s e q u e n c e s #!''%-+ A!"!22!<+ L$%+for its#35)*+S+&+4-$(53(I48*-+5$5'#8-$(H"4A+2(53(T54)*+4&(/&%#-@(from more valuable to their present base materials.preserva

8+&)"42(."!85&)#&+&)-$(-48*-+5$5'2@(K+(*-%(5&8+(S+&+4-$(P"&&#&'*-6<(-$)*5"'*(&5)(-&(-48*-+5$5'#.)(!2(Where such fables are believed, we must cease to

Lewis, borne on February 16, 1800 in AldermanA#.#)+%(K-4-JJ-(#&(CDUR(1*+4+(*+(5!)-#&+%(A-4#5".()4-#&#&'<(#.(5&+(53( )*+('4+-)+.)(3#'"4+.(53(&#&+)++&)*(%N5%,436%*+ !,-+ 5$%+ 2'!#%*+ >$3#$+ $!4+ 0%%,+ 0.3'5+ &1+ 0"3#@4*+ 34+ !0&.5+ 5$"%%+ /3'%4+ 3,+

bury, nearson's association of the ruins at Harappa with Sanhope for even reasonable fiction. I found some-&)#O"#)#+.(3456( )*+(154B6+&@(I.(H)"-4)(=#"5))(

Majesty's 24th Regiment of Foot and re-enlisted in8+&)"42(."!85&)#&+&)-$(-48*-+5$5'2@(K+(*-%(5&8+(#3"#./1%"%,#%<+ L$%"%+ 34+ !+ ".3,%-+ #35!-%'+ &,+ 5$%+ "36%"+ 43-%+ &1+ 5$%+ 5&>,S+ 0.5+ &5$%">34%+gala is incorrect, but it was something that Masson

4+85"&).<(P"&&#&'*-6(4+-$#V+%( )*-)( )*+.+(.+-$.(1+4+(A#.#)+%(K-4-JJ-(#&(CDUR(1*+4+(*+(5!)-#&+%(A-4#5". (the Army of the East India Company under a falsecannot fix its era from any one of them" (12).never gave up, and the search for Sangala contin.56+)*#&'(O"#)+(5").#%+( )*+(4-&'+(53(/&%#-&(-&)#O"#)#+.(

name (12). B&51&()5(*#6W(*+(3+$)()*+2(1+4+(+X)4+6+$2(-&8#+&)(-&%(-&)#O"#)#+.(3456( )*+(154B6+&@(I.(H)"-4)(=#"5))((A!"!22!+34+!+2%"1%#5+#$!&4*+!,-+$!4+,&5+!,+%,53"%+0.3'-3, (R+5$%+0"3#@4+$!6%+0%%,+"%/&6%-+ues to this day. On the other hand, Masson was an4+85"&).<(P"&&#&'*-6(4+-$#V+%( )*-)( )*+.+(.+-$.(1+4+(

Alexander Burnes:
#6J54)-&)@(/)(1-.<(*51+A+4<(&5)("&)#$(.+A+&)2(2+-4.($-)+4(1856 two brothers, John and William Brunton, were

insightful man of considerable energy, with a deep 5&+0.3'-+!+4/!''+2'!#%+&1+5$%+&'-+,!/%+$!"-+0)<+L"!-353&,+13N%4+5$%+1!''+&1+A!"!22!+!5+5$%+brought Masson into contact with a number of im)*-)( )*+#4( )4"+(.#'&#3#8-&8+(1-.(4+85'&#V+%(-&%( )*+(

interest in antiquarian science. He made a sound B&51&()5(*#6W(*+(3+$)()*+2(1+4+(+X)4+6+$2(-&8#+&)(-&%(engaged in laying out and

building the East Indian 8#A#$#V-)#5&(&51(&-6+%(3456( )*+(.#)+(53(K-4-JJ-(1-.(
portant figures, not the least of whom was Sir Alex

contribution to the history of Pakistan's archaeology,4!/%+ 2%"3&-+ !4+ M$&"@&5%+ TDUGG+)%!"4+ !(&V*+ !,-+ 5$%+ 2%&2'%+ !4#"30%+ 354+ ".3,4+ 5&+ 5$%+and a number of prehistoric discoveries in the)*-)( )*+#4( )4"+(.#'&#3#8-&8+(1-.(4+85'&#V+%(-&%( )*+(;(-%?7$@"34$-%6533(3#1":%!"#$%&&%

6%,(%!,#%+ &1+ W&-+ &,+ A!"!22!S+ 354+ (&6%",&"*+ >$&+ #'!3/%-+ #%"5!3,+ 2"363'%(%4+ &,+ 5$%+8#A#$#V-)#5&(&51(&-6+%(3456( )*+(.#)+(53(K-4-JJ-(1-.(I passedhis credit. Possehl discloses that Massaon was notlumba, /!""3!(%+&1+%6%")+#&.2'%+3,+$34+#35)*+!,-+3,+5$%+#&."4%+&1+$34+4%,4.!'353%4*+>!4+(.3'5)+&1+in fact Masson, nor was he from Kentucky. He was examine the ruins of an ancient city, called 3,#%45<+;5+!+'!5%"+2%"3&-*+A!"!22!+0%#!/%+!+=&$!//%-!,+5&>,S+!,-+5$%"%+34+!+5&/0+&1+!+

age was to deliver a gift of five horses and a carsite to construct and repair their homes was a local riage from the King of England to Ranjit Singh, the village practice that had created a situation that

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Harappan Civilization - The Material Culture
3456()*+.+(6+65#4.(#&(*#.(!55B(*!"#$%&'("%)*+,-%./***

charge of the southern section, his brother of that in Alexander Cunningham, the first Director General of the Punjab, from Multan northwards. John, in re)5('+)(!-$$-.)(354( )*+($#&+(53( )*+(0-#$1-2@(/3(-$$(/(*+-4%(the Archaeological Survey of India. tirement, wrote a very delightful book of memoirs for

1+4+()4"+<()*#.(4"#&+%(8#)2<(!"#$)(53(!4#8B.<(15"$%(3546(-(;<$0*1%+/%=+13%>-530+3% **General Cunningham:** General Alexander

his grandchildren, covering the years 1812 to 1899, Cunningham, who later became the head of a newly and in this he tells how he had heard of a ruined created Archaeological Survey of India, visited ancient city, Brahminabad, not very far from the lineHarappa in 1853 and 1854 before railway construcof the railway he was building. Stuart Piggott, that

?"$)-&:9-*54+($#&+(4-&(&5)(3-4(3456(-&5)*+4(-&8#+&)(8#)2<(!2( )*+&(-(.*-J+$+..(*+-J(53(
tion. Like others before him, he was impressed by
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imaginative archaeologist of Southeast Asia, copies
its size, especially the massive walls of what he
A#$$-'+(53(K-4-JJ-(5&()*+(.#)+@(;5*&(6".)(*-A+()5$%(L#$$#-6(53(*#.(!4#$$#-&)(.8*+6+(354(
from these memoirs in his book
Prehistoric India:
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incorrectly thought had been a Buddhist monastery,
“I had been much exercised in my mind,
and
planned
to
return
to
conduct J$"&%+4+%(-.(4")*$+..$2(-.(G4-&*6#&-!-%(*-%(!++&<(-&%()5%-2()*+()4-#&.(4"6!$+
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excavations.

how we were to get ballast for the line of the Rail*"&%4+%(6#$+.(53($#&+($-#%(5&(-(.+8"4+
(35"&%-)#5&(53()*#4%:6#$$+&&#"6(!4#8B:!-).@(N"4#&'('()*+,$-.%+/%01$%2345)%6(,(7(8"0(+3!
way. If all I heard were

true, this ruined city, built(
of bricks, would form a
grand quarry for ballast”.
Brahminabad (a medieval

When he returned many years later, the bricks from
)*+(!4#8B:45!!#&'<(-&)#O"#)#+.(53(A-4#5".(B#&%.(1+4+(35"&%(-&%(.56+(53()*+6(B+J)(!2()*+(
the original construction had been removed (7) and
(were nowhere to be seen.
9$3$-"7%6533(3#1":(In 1858, the
East India Company (
was dissolved, and the
city of Muhammad Bin *51+A+4<(+&%(*+4+@(I)(7-4-8*#<(;5*&(1-.(-(6+6!+4(53(
Qasim‘s time) was there
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region came under the
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British Crown, a condi
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tion that prevailed until
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English engineer, and the
1947.

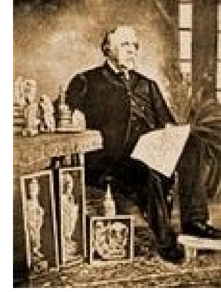
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line laid.!"#$%&'("%)*+,-%./**Piggott S+&+4-$(P"&&#&'*-6<(-$)*5"'*(&5)(-&(-48*-+5$5'#.)(!2(Stuart
tion" of archaeology as

continues: “Now the
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an official focus of the
Multan-Lahore line ran 8+&)"42(."!85&)#&+&)-$(-48*-+5$5'2@(K+(*-%(5&8+(



colonial government
not far from another an
A#.#)+%(K-4-JJ-(#&(CDUR(1*+4+(*+(5!)-#&+%(A-4#5".(
;<$0*1%+/%=+13%>-530+3% took place in 1861. Al
cient city, by then a
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exander Cunningham,
shapeless heap of huge,
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now retired from mili
dusty mounds, part of which
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tary service, led these
?"$)-&:9-*54+($#&+(4-&(&5)(3-4(3456(-&5)*+4(-&8#+&)(8#)2<(!2( )*+&(-(.*-J+$+..(*+-J(53(
B&51&()5(*#6W(*+(3+$)()*+2(1+4+(+X)4+6+$2(-&8#+&)(-&%(

had been robbed of bricks to build the modern vil
'"+<(%".)2(65"&%.<(J-4)(53(1#8*(*-%(!++&(45!!+%(53(!4#8B.( )5(!"#$%( )*+(65%+4&(
lage of Harappa on the site. John must have told A#$$-'+(53(K-4-JJ-(5&()*+(.#)+@(;5*&(6".)(*-A+()5$%
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efforts (10). As noted
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8#A#$#V-)#5&(&51(&-6+%(3456( )*+(.#)+(53(K-4-JJ-(1-.(
5!)-#&#&'(!-$$-.)(354( )*+( )4-8BM(-(J4+*#.)54#8(8-J#)-$(53( )*+(="&>-!<(K-4-JJ-<(1-.(William of his brilliant
scheme for obtaining ballast ham had a strong in
J$"&%+4+%(-.(4")*$+..$2(-.(G4-&*6#&-!-%(*-%(!++&<(-&%()5%-2()*+()4-#&.(4"6!$+(5A+4(-(for the track; a
prehistoric capital of the Punjab,
*"&%4+%(6#$+.(53($#&+($-#%(5&(-(.+8"4+(35"&%-)#5&(53()*#4%:6#$$+&&#"6(!4#8B:!-).@(N"4#&'(Harappa, was
plundered as ruthlessly as
)*+(!4#8B:45!!#&'<(-&)#O"#)#+.(53(A-4#5".(B#&%.(1+4+(35"&%(-&%(.56+(53()*+6(B+J)(!2()*+(

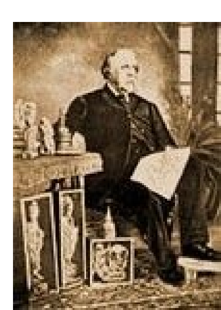
Branhminabad had been, and today the trains rum
ble over a hundred miles of line laid on a secure
(foundation of third-millennium brick-bats. During the
(brick-robbing, antiquities of various kinds were
found and some of them kept by the workmen and
the engineers." (

terest in the !"#$%&&% region's
past, and although he was trained in Sanskrit, unlike many of his contemporaries whose focus lay in the study of texts, his primary interests were in numismatics and archaeological fieldwork, which he considered a more reliable basis with which to reconstruct the history of the Indian past than the literary scholarship that dominated historical studies.

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The Brunton's connection with archaeology
-$.5(!+$5&'+%( )*+(
does not, however, end here. At Karachi, John was

a member of the ruling elite, of which also belonged
the Commanding Officer of the Line Regiments sta
tioned there. His name was Cunningham. When he
retired from active service in 1861 he was ap
pointed Director-General of Archaeological Survey

of Northern India. General Cunningham, although not an archaeologist by training, is one of the great est figures of nineteenth century subcontinental ar chaeology. He had once visited Harappa in 1856 where he obtained various antiquities from the workmen. As Stuart Piggott recounts, Cunningham



realized that these seals were something quite out side the range of Indian antiquities known to him: he;(-%?7$@"34$-%6533(3#1":% felt they were extremely ancient and important. It

!"#$%&&% was, however, not until seventy years later that their true significance was recognized and the civilization now named from the site of Harappa was identified and defined. The two early notices of Harappa, by Masson and Burnes, have historical importance primarily because they came to the attention of Sir
By the time he took on the directorship of the Archaeological Survey, Cunningham was "widely acknowledged as the subcontinent's foremost expert in archaeology" (7), having conducted excavations and surveys in numerous areas.

Later, Cunningham returned to Harappa to conduct a proper survey and to map the site. He published a brief account of his investigations and provided illustrations of a selection of artifacts, including stone tools, pottery, and small objects that resembled "chess pawns." In 1875 Cunningham reported that he visited Harappa on three occasions: “In 1853, and again in 1856, I traced the remains of flights of stairs on both the eastern and western faces of the high mound to the northwest, as well as the basement of a large square building”. In this report he noted the size of the site (4 kilometers in circumference) and the height of the mounds (12 to 18 meters). He also noted, with considerable regret, that many of the features he had seen earlier had disappeared:

“. . . The whole have now been removed to form ballast for the railway. Perhaps the best idea of
essed with Harappa's massive size and rom hundreds of years of the accumula-
(@(!$'!$'DEFG5'C'%.(1#'"%+#'.#;(!$2'-&'&/!@+%2'-&'2%(!.2'-$'6-%+'%+#'#(2%#.$'($'",#2%#.$' and
human activities. He commented &(1#2' -&' %+#' +!@+' ;-9$'" %-' %+#' $-.%+,#2%5' (2' ,#//' (2' %+#'
6(2#;#$%' -&' (' /(.@#' 2H9(.#'d) the thousands of artifacts still visible
region's past, and his contemporaries although he was trained in Sanskrit, unlike many of

whose focus lay in the study of texts, his primary interests were in numismatics and archaeological fieldwork, which he considered

mistakenly believed the site dated to an
Ancient Pakistan - An Archaeological History the Indian been mentioned by Alexander's troops.

the extent of the ruined brick mounds of Harappa
%+#'+#!@+%'-&'%+#';-9$"2'IDJ'%-'DE';#%#.2K)'3#'(/2-'$-%#"5',!%+'1-$2!"#.(6/#'.#@.#%5'%+
(%'nts, whose views Masson recorded, the
;($0'-&'%+#'&#(%9.#2'+#'+('"2##$'#(./!#.'+("""!2(44#(.#"L'
may be formed from the fact that they have more than sufficed to furnish brick ballast for about 100 miles of Lahore and Multan Railway". Cunnigham 6#2%'!"#('-&'%+#'#>%#$%'-&'%+#'.9!$#"'6.!1M';-9$"2'-&'3(.(44(';(0'6#'&-.;#"'&.-;'%+#'st India Company, Alexander Burnes

ailing up the Indus River to assess the of the company's
) and provided
army. He arrived at

' hat parts of the ancient
ented on the ongoing
additional details to

city had been destruction of idents. Removing baked bricks from eir homes was a local village practice urnes referred to as "perfect chaos"

n grander scale would prove to be in Harappa. In spite of the visits of cum entation of the site, engineers

of a major railway system designed to recognize the site's significance its preservation. Railway engineers

Harappa's buildings to ween Multan and Lahore. provide General

r became the head of a newly cre

I. a, visited Harappa in 1853 and 1854 thers before him, he was impressed aIls of what he incorrectly

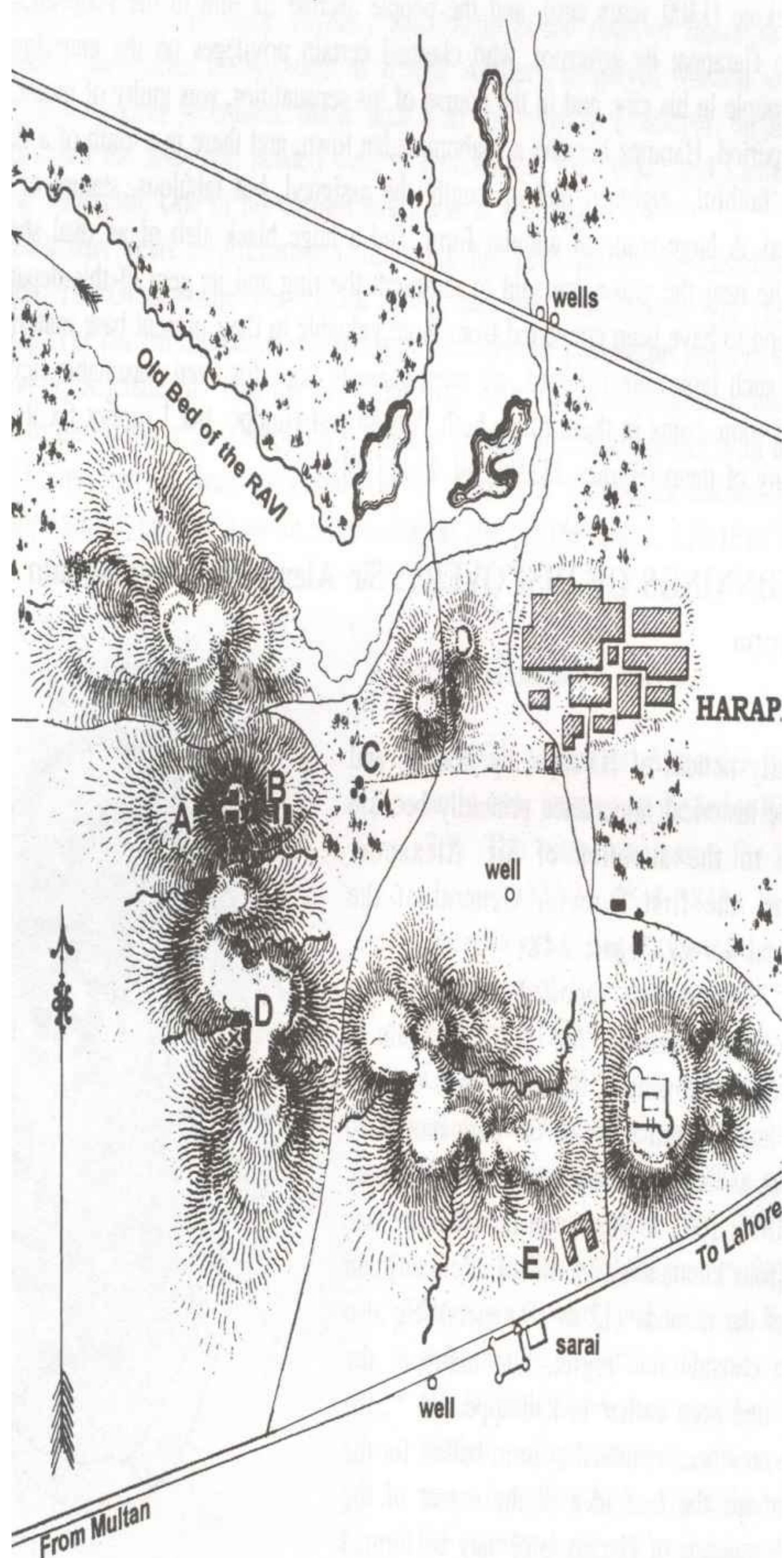
and planned to return to thought conduct

any years later, the bricks from the moved (Lahiri 2005:18) and were

!%2' "#2%.91%!-$' !2' was dissolved, and the region came h Crown, a condition that prevailed rchaeology as an official focus of the

Ruins at HARAPÂ

A. Remains of Temple (?)
B. Tomb of Nao-Gaja
C. Thumb-Rang of Nao-Gaja
D. Masses of Charred Grain
E. Foundations of Monastery



,(2' &(.' &.-;' %

!"#$%&'% seems to have accepted a view expressed by other visitors that the site was a castle of not very great age. “The people”, he noted, “refer the ruin of Harappa to the wickedness of a Raja named Har Pal, who was in the habit of claiming the sovereign‘s rights at every bridal. At last, in the exercise of this royal privilege, he committed incest with a near relative. The girl prayed to heaven for vengeance and then the city of Harappa was instantly destroyed. Some say that an invader suddenly appeared, and the city was taken by storm, and the Raja killed. The period of its destruction is vaguely said to be 1,200 or 1,300 years ago. I am not inclined to put some faith in this belief of the people, as they tell the same story of all the ruined cities in the plains of the Punjab, as if they had all suffered at the same time from some sudden and common catastrophe”. Cunningham collected a small quantity of Indus material from the mounds, but he was far from suspecting its significance, nor did he guess the part the site was later to play in revealing Pakistan‘s ancient past.

studies. Survey,
foremost Cunningham excavations there, which apparently was only a minor success.

Later, Cunningham returned to Harappa to conduct a proper survey and
and

But, his report on this work includes the first site
to map the site. He published
provided illustrations plan and his designations of the principal areas at
Harappa are still used today (A-B, C, D, and E). “I of a selection
that resembled
at
a brief account of his investigations of artifacts, including stone
tools, pottery, and small objects "chess pawns." but His most spectacular
made discovery several was a seal that excavations belonged Harappa, Clark (later the
to a Major
donated whole surface had been so completely cleared out illustrated by the Railway contractors that I found very little
worth preserving”.
The seal is a smooth black stone without polish. On it is engraved very deeply a
bull, without a hump, **The** looking **Early Discoveries** to the right, with two stars under **of** the neck. Above **Harappan**
the bull there is an inscription
Seals: Cunningham’s most spectacular discovery at They are certainly not Indian letters; and as the bull which accompanies them
is without
a hump
Harappa was a seal that belonged to a Major Clark
[like the traditional zebu cattle], I conclude that the seal is
foreign to India. (later donated to the British Museum), which he de
a more reliable basis with which to reconstruct the history of past than the literary scholarship that dominated historical By the time he took on the
Cunningham The wanton plunder
directorship
of
was "widely acknowledged
of the Archaeological

Harappa stirredas the subcontinent's

to in archaeology" carry (Lahiri out a 2005:498), modest having excavation

49

Major Clark's seal from Harappa reported by Alexander by Alexander

Cunningham. Courtesy of the British Museum. ()*+,-$./%,0%12$%3456*%7)-)8)9"1),4**!**











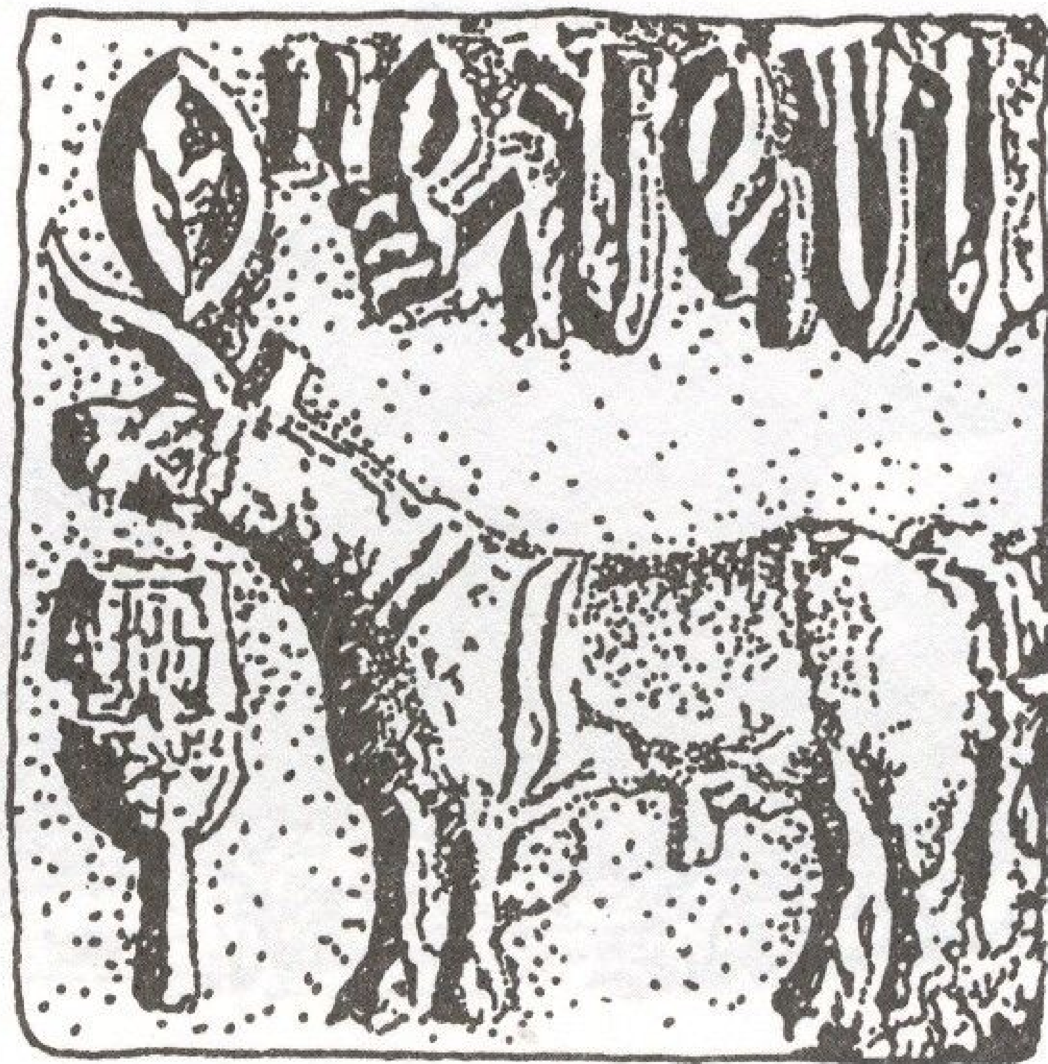





1 2 3 4 5 6 7 8 9 10 Centimetres
BRITISH 1 MUSEUM 2 3 Inches 4

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Discovery of the Indus CivilizationHarappan Civilization - The Material Culture
Discovery of the Indus Civilization

scribed as follows: “The seal is a smooth black when the significance of Mohenjo-daro and scribed as follows: “The seal is a smooth black stone without polish. On it is engraved very deeply with complex societies and cultures then knownHarappa was first realized. These were published stone without polish. On it is engraved very deeply a bull, without a hump, looking to the right, with twoonly from later periods in the history of the subconby Sir John Marshall (1922) in the Cambridge His

scribed as follows: “The seal is a smooth black stars under the neck. Above the bull there is an in with complex societies and cultures then known

a bull, without a hump, looking to the right, with two tinent. The fact that it displayed an unknown script tory of India. Marshall‘s professional intuition was stars under the neck. Above the bull there is an in

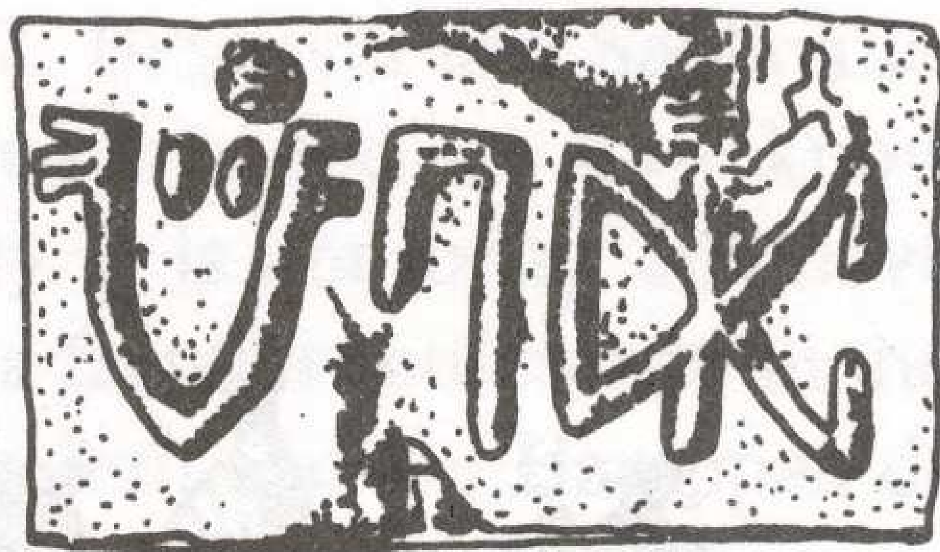
stone without polish. On it is engraved very deeply was a clear indication that Harappa may have beenonly from later periods in the history of the subconscription in six characters, which are quite

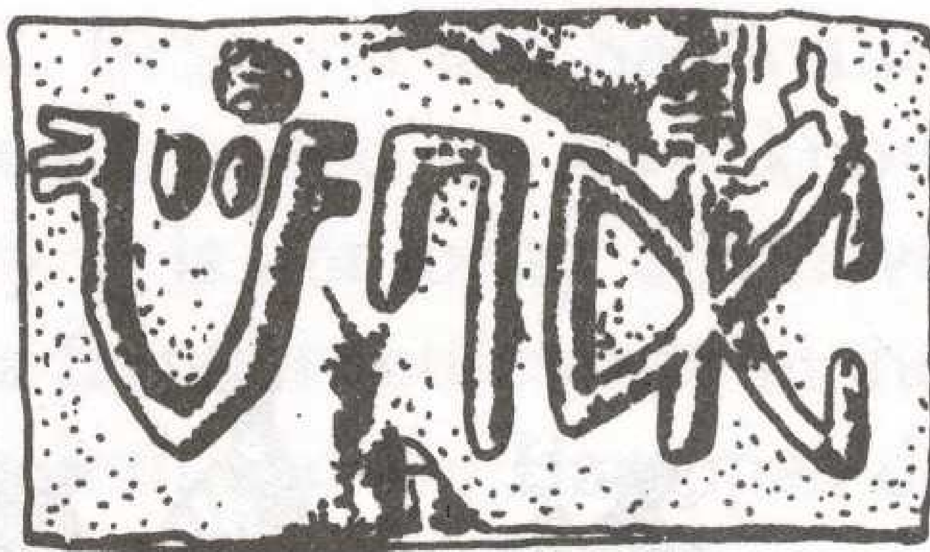
unknown working at full speed when he said in connection scription in six characters, which are quite unknowna bull, without a hump, looking to the right, with two
stars under the neck. Above the bull there is an in
to me. They are certainly not Indian letters; and as
scription in six characters, which are quite unknownthe bull which accompanies them is without a hump
the bull which accompanies them is without a hump
the site of a culture not recorded in textual sources,to me. They are certainly not Indian letters; and as was a clear indication that Harappa may have been

In
1886
Longworth
the site of a culture not recorded in textual sources,"The potter's art, on the other hand, had

Dames published a to me. They are certainly not Indian letters; and as [like the traditional zebu cattle], I conclude that thethough this possibility went unnoticed at the time.been practiced throughout India from time immemo[like the traditional zebu cattle], I conclude that theInsecond seal from Harappa that had been acquired the bull which accompanies them is without a hump by an education inspector by the name of Harvey. Inrial, and in the Punjab and the North-West, which

![like the traditional zebu cattle], I conclude that theThe seal could besecond seal from Harappa that had been acquiredwere in closer touch with Persia and Mesopotamia,his one-page note, Dames discusses and illustrates
held
with
two finby an education inspector by the name of Harvey. In
Cunningham-Clark seal and the new find. J.F.Fleetit is likely enough that burnt bricks were used at a
his one-page note, Dames discusses and illustrates
seal is foreign to India" (7).
!

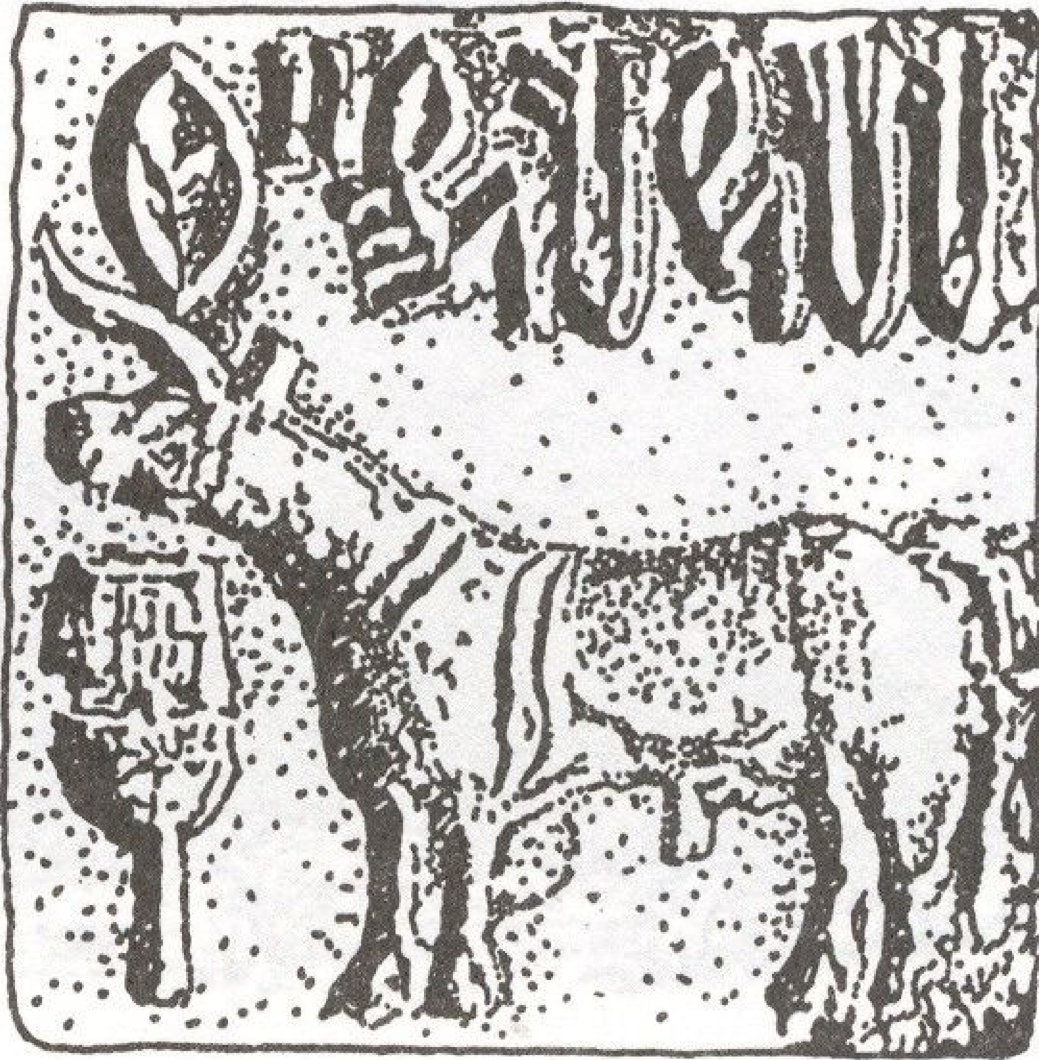




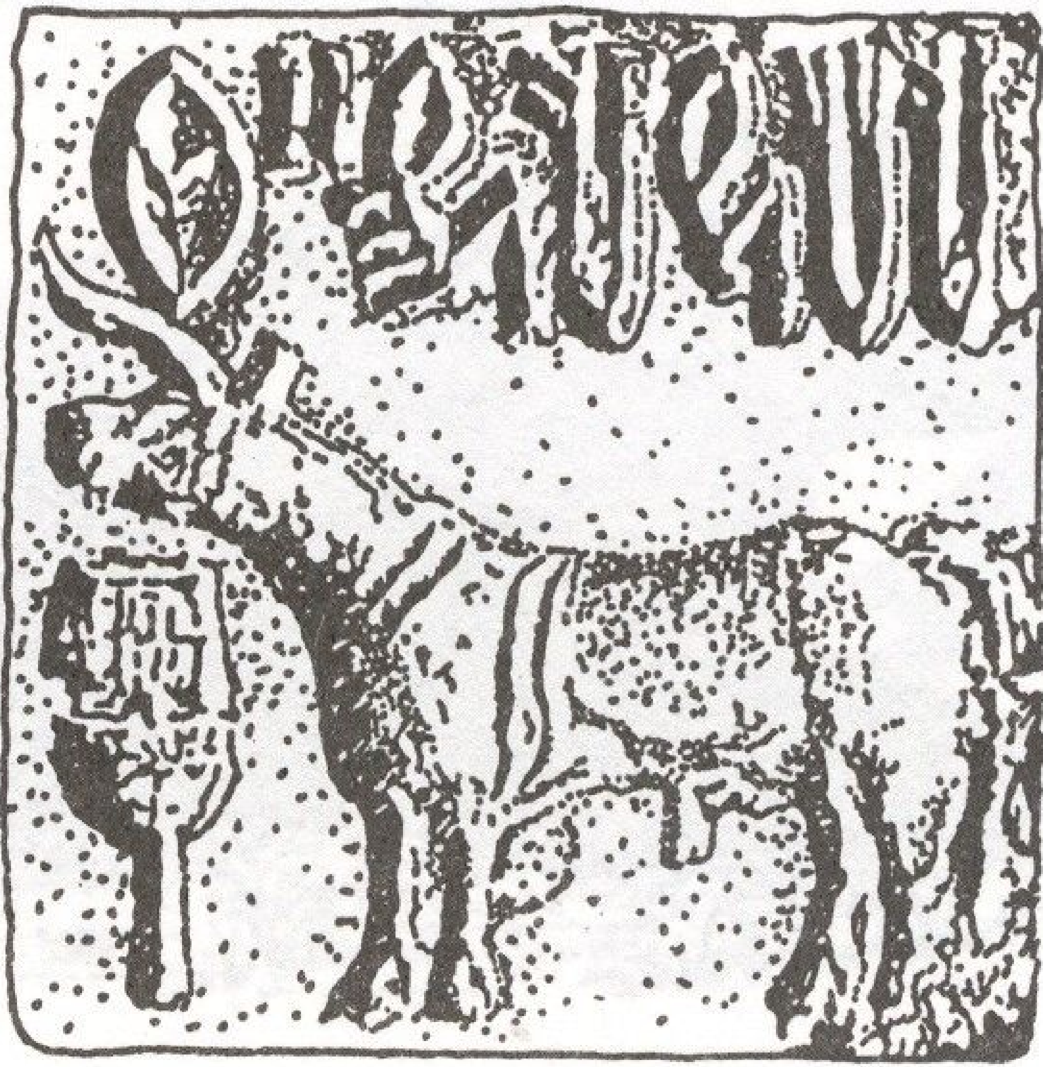
Drawing of Marshall’s seals from
=".">>"%>6?8)*2$5%)4%@'AA%%B"01$.%
Harappa, published in 1922 (*af*=".">>"%>6?8)*2$5%)4%@'AA%%B"01$.%

ter Possehl)
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32) 9.#)



(."D)4#%,0%12$%E,*1,4%64)+,.4%*$"8% (."D)4#%,0%12$%E,*1,4%64)+,.4%*$"8%

B"01$.%F,*D"G/%@'A'C% B"01$.%F,*D"G/%@'A'C%

gers by gripping a small knob on the

published a third seal from Harappa in 1912 that Cunningham-Clark seal and the new find. J.F.Fleetmore remote

age. In this connection a special inter

had been acquired by O‘Connor, then the Districtest attaches to certain seals of unknown date and

Superintendent of Police. O‘Connor privately exca

published a third seal from Harappa in 1912 that

had been acquired by O‘Connor, then the Districtorigin which are said to have been found from time

back. pressed against

vated at the site in 1886, and this seal came from

Superintendent of Police. O‘Connor privately exca

his work there. Two more seals came to the noticeto time among the remains of brick structures at

soft

clay

vated at the site in 1886, and this seal came from Harappa in the Montgomery District of the Punjab.

of the Archaeological Survey of India prior to 1924,

pliable material, the significance of Mohenjo-daro and The majority of the seals are engraved with the de when of the

Archaeological Survey of India prior to 1924,
left a distinctiveHarappa was first realized. These were publishedvice of a bull with head outstretched over some un

when
image,
presumed
by Sir John Marshall (1922) in the Cambridge His
the significance of Mohenjo-daro andcertain object, possibly in the act of being sacrificed,Harappa was first realized. These were published
to identify an inditory of India. Marshall's professional intuition was and all of them bearing legends in a pictographic vidual
or
by Sir John Marshall (1922) in the Cambridge His

tory of India. Marshall's professional intuition was script, which remains to be deciphered". just as a signaturewith these objects:working at full speed when he said in connectionPossehl reports (12) that there are two

or
corporate
with these objects:
"The potter's art, on the other hand, had
more Harappan seals that came into private hands
does today. Of all
been practiced throughout India from time immemo
prior to the discovery of the Indus Civilization. The
the
finds
discov
been practiced throughout India from time immemorial, and in the Punjab and the North-West, which first was purchased in Cairo in 1912, but probably
ered
at
rial, and in the Punjab and the North-West, whichwere in closer touch with Persia and Mesopotamia,
Harappait is likely enough that burnt bricks were used at acomes from Damascus. It is a unicorn seal and
during this period,more remote age. In this connection a special interseems to be slightly damaged. The second seal is
it is likely enough that burnt bricks were used at a

the stamp seal exest attaches to certain seals of unknown date andalso a unicorn. It is said to have been purchased by more remote age. In this connection a special inter
cited the mostest attaches to certain seals of unknown date andorigin which are said to have been found from timeGriswold from a coin dealer in the Punjab in 1910. It scholarly
because
origin which are said to have been found from timewas given to the Museum of Fine Arts, Boston in

it
to time among the remains of brick structures atHarappa in the Montgomery District of the Punjab.
1929, not having been published prior to that date. that the people who
Harappa in the Montgomery District of the Punjab.The majority of the seals are engraved with the de
vice of a bull with head outstretched over some un The sealThe majority of the seals are engraved with the de**Sir John Marshall and his Staff:** left it behind werevice of a bull with head outstretched over some uncertain object, possibly in the act of being sacrificed,discovered items were
literate, acertain object, possibly in the act of being sacrificed,suggestive of a "half-glimpsed world" (7) that re
and all of them bearing legends in a pictographic

associated withscript, which remains to be deciphered”.mained unknown until the 1920s. Cunningham reand all of them bearing legends in a pictographic
complex societies Possehlscript, which remains to be deciphered”.tired in 1885, after which the archaeological survey

and
cultures
then
Possehlmore Harappan seals that came into private hands
went through restructuring, decentralization, division
prior to the discovery of the Indus Civilization. The
known only from into regional circles, and finally recentralization un
later periods in the
prior to the discovery of the Indus Civilization. The
first was purchased in Cairo in 1912, but probably
der the leadership of John Marshall in 1902 (10). As

first was purchased in Cairo in 1912, but probably comes from Damascus. It is a unicorn seal and history of the subcomes from Damascus. It is a unicorn seal andthe head of a state-sponsored institution, Marshall's seems to be slightly damaged. The second seal is

continent. The factseems to be slightly damaged. The second seal is position at the archaeological survey came under that it displayed an
also a unicorn. It is said to have been purchased by

also a unicorn. It is said to have been purchased by Griswold from a coin dealer in the Punjab in 1910. Itthe close supervision of the viceroy of India, Lord unknown scriptGriswold from a coin dealer in the Punjab in 1910. ItCurson, who selected him for the position.

was a clear indica
was given to the Museum of Fine Arts, Boston in
1929, not having been published prior to that date.John Marshall took up the charge in 1902.

tion
that
Harappa
Sir John Marshall and his Staff:

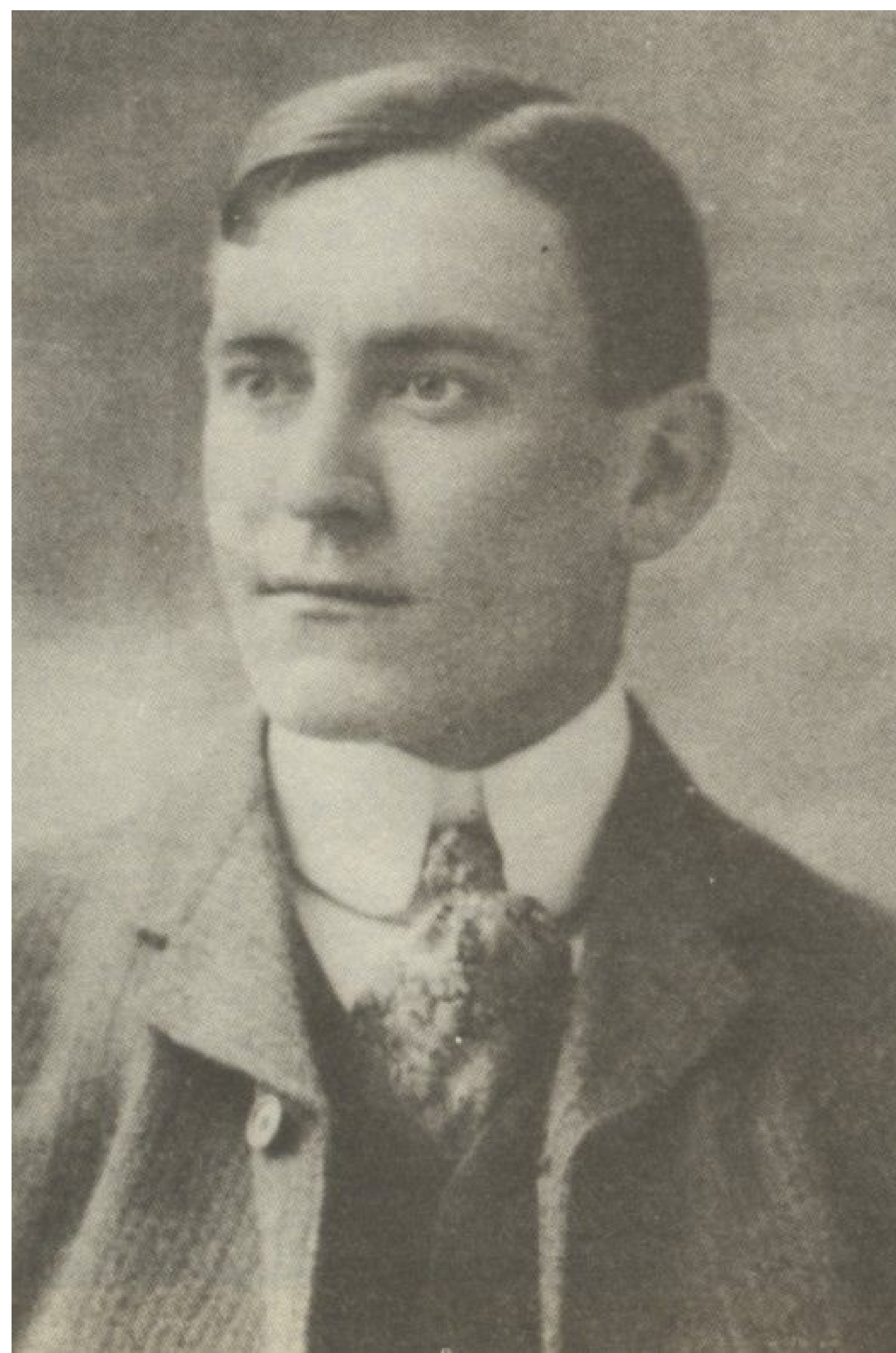
The seal
Among his innovations were a conservation policy, may have been theand others**Sir John Marshall and his Staff:** The sealwere
and
others
the publication of annual reports, and the training of items
suggestive of a "half-glimpsed world" (7) that reitems were
subsequently discovered
site of a culture notsuggestive of a "half-glimpsed world" (7) that reIndians as senior officers of the Archaeological Sur**Drawing of the Boston uni**
recorded
in
textualmained unknown until the 1920s. Cunningham re
mained unknown until the 1920s. Cunningham retired in 1885, after which the archaeological survey vey, posts few Indians had previously occupied. He**corn seal (***after Goswamy,*
The seal could be held with two fingers by sources, though this also insisted on the employment of such scientific
went through restructuring, decentralization, division
into regional circles, and finally recentralization un
against soft clay or other pliable material, it left a
The seal could be held with two fingers by tired in 1885, after which the archaeological survey
gripping a small knob on the back. When pressedpossibility went unnowent through restructuring, decentralization, division excavation techniques as he had learned in his briefgripping a small knob on the back. When pressedticed at the time.into regional circles, and finally recentralization unearlier career as a classical archaeologist. In many M In 1886distinctive image, presumed to identify an individual der the leadership of John Marshall in 1902 (10). As
M Longworth
or a group just as a signature or corporate sealsecond seal from Harappa that had been acquiredniques left much to be desired. In
Dames published athe head of a state-sponsored institution, Marshall's ways an advance on previous work, these tech
or a group just as a signature or corporate sealdistinctive image, presumed to identify an individual
position at the archaeological survey came under particular, aldoes today. Of all the finds discovered at Harappa the close supervision of the viceroy of India, Lord *!"#$"*
does today. Of all the finds discovered at Harappaby an education inspector by the name of Harvey. In though the three-dimensional position of objects)93)!"#$%&'#()9.#)
<(#%9K)3(),&)>&',%&).,193(,;)during this period, the stamp seal excited the most Curson, who selected him for the position.was noted, all recording was by arbitrary levels *!"#$"* during this period, the stamp seal excited the most his one-page note, Dames discusses and illustrates Curson, who selected him for the position.)93)!"#$%&'#()9.#)<(#%9K)3(),&)>&',%&).,193(,;)scholarly interest, because it implied that the people
scholarly interest, because it implied that the peopleCunningham-Clark seal and the new find.
J.F.FleetJohn Marshall took up the charge in 1902.
!"#$%&'% taken from the local ground surface. Although the !"#$%&'%
who left it behind were literate, a feature associated
who left it behind were literate, a feature associated John Marshall took up the charge in 1902.

published a third seal from Harappa in 1912 that Among his innovations were a conservation

policy,greater part of Marshall's work still focused on hishad been acquired by O‘Connor, then the District
Superintendent of Police. O‘Connor privately exca
vated at the site in 1886, and this seal came from [24]
his work there. Two more seals came to the notice
of the Archaeological Survey of India prior to 1924,
torical sites, in the south megalithic tombs continued to attract attention and several ash mounds were also excavated, and in the northwest, including Kashmir, prehistoric material was also being discovered. Marshall and his survey officers con

ducted only limited excavations during his early Great, or in Indian historic terms, the pre-Mauryan years as Director General. They excavated several epoch - a real breakthrough in ancient history. The Buddhist sites and monuments, although Marshall understanding of the nature of the remains foundInstead, he deployed colleagues to conduct work at seems to have recognized the possibility that aunder the leadership of John Marshall in 1902 (10). there was seriously compromised by the havoc non-Buddhist sites. In 1909, Hirananda Sastri was more ancient past existed (7). Marshall did not conAs the head of a state-sponsored institution, Marwrought by the railway engineers who had earlier sent to Harappa to oversee a survey in connection duct any excavations at these sites until much later.shall's position at the archaeological survey came plundered the site for bricks. As Possehl recounts inwith the site's preservation. The brick robbing there Instead, he deployed colleagues to conduct work atunder the close supervision of the viceroy of India, hishad continued, and Sastri was commissioned to non-Buddhist sites. In 1909, Hirananda Sastri was *spective*determine whether the site could be protected or sent to Harappa to oversee a survey in connectionJohn Marshall took up the charge in 1902. sons at Harappa. He helped archaeologists solvepurchased from the landowners. Sastri's report was with the site's preservation. The brick robbing thereAmong his innovations were a conservation policy, the “mystery of the seals”. But neither he nor Marnever published, and from what is known, he was had continued, and Sastri was commissioned tothe publication of annual reports, and the training of shall understood that there was an entire civilizationnot impressed with the site's importance; neverthedetermine whether the site could be protected or waiting for them to be discovered. This insight was

to come from the south, in Sindh, at a place calledbricks used in buildings at Harappa was different


Mohenjo-daro.from bricks found at Buddhist and other early his
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toric cities (7). This indicated that the site was not of poorly preserved Buddhist stupa, situated on the mound's summit, but during explorations here R. D.Marshall was familiar with the material, inBanerji had picked up a flint scraper, suggesting thecluding the curious seal, that Cunningham had remound had far greater antiquity; he therefore beganinexcavationsstructed his colleague in the ASI, the Rai Bahadur yielded seals inscribed with unknown characters,at comparableHarappa. He opened trenches on the mound laHarappa, the site was found to have a great depthbeled 'A-B' on Cunningham plan as well as on the of deposits belonging to a huge ancient brick-builtnorthernmost mound, now labeled 'F'. Sahni found city. Marshall was on leave at this time, and so itmore stamp seals in stratigraphic context, and by was not until the summer of 1924 that he studiedthe end of the season Marshall felt that the results the seals and other novel material and the architec *prior* tural remains from these two sites.

Based on theto Alexander the Great, or in Indian historic terms, stratigraphy of the sites, with Indus deposits wellthe pre-Mauryan epoch - a real breakthrough in anbelow those of the historical period, on the use ofcient history. The understanding of the nature of the copper but not iron, and on the mysterious writingremains found there was seriously compromised by onthe havoc wrought by the railway engineers who Brahmi script of the later centuries BC, he conhad earlier plundered the site for bricks. As Possehl cluded that the Indus cities predated the Mauryan *The Indus Civilization – A Contem*period.*porary Perspective,* Sahni spent three consecutive

field seasons at Harappa. He helped archaeologists solve the "mystery of the seals". But neither he nor Marshall understood that there was an entire civili

"Not often has it been given to archaeolo
zation waiting for them to be discovered. This ingists, as it was given to Schiemann at Tiryns

Sir John Marshall sight was to come from the south, in Sindh, at a:).%;,24% <".*2"88% and Mycenae, or to Stein in the deserts of

place called Mohenjo-daro.

Turkestan, to light upon the remains of a longpurchased from the landowners. Sastri's report was vey, posts few Indians had previously occupied. He forgotten civilization. It looks, however, at thisnever published, and from what is known, he was moment, as if we were on the threshold of also insisted on the employment of such scientific "Not often has it been given to archaeolo

such a discovery in the plains of the Indus" not impressed with the site's importance; neverthe excavation techniques as he had learned in his
less, he did note that the proportion of the standard
brief earlier career as a classical archaeologist. In
gists, as it was given to Schiemann at Tiryns *Sep*bricks used in buildings at Harappa was different*(John Marshall, writing in Illustrated London News of*
and Mycenae, or to Stein in the deserts of

many ways an advance on previous work, these *tember 20, 1924)*from bricks found at Buddhist and other early hisTurkestan, to light upon the remains of a longtechniques left much to be desired. In particular, forgotten civilization. It looks, however, at thistoric cities (7). This indicated that the site was not of Buddhist origin.although the three-dimensional position of objects moment, as if we were on the threshold of

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Marshall was familiar with the material, in
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greater part of Marshall's work still focused on his
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previously, found distinctive stone implements, and *tember 20, 1924)*
Marshall

!(,!'torical sites, in the south megalithic tombs contin

structed his colleague in the Archaeological Survey
ued to attract attention and several ash mounds
of India, the Rai Bahadur Deya Ram Sahni, to con
duct an excavation atwere also excavated, and in the northwest, includopened
ing Kashmir, prehistoric material was also being
trenches on the mound labeled ‘A-B’ on Cunning
discovered. Marshall and his survey officers con
ham plan as well as on the northernmost mound,
ducted only limited excavations during his early
now labeled ‘F‘. Sahni found more stamp seals in
years as Director General. They excavated several
stratigraphic context, and by the end of the season
Buddhist sites and monuments, although Marshall
Marshall felt that the results proved that Harappa

seems to have recognized the possibility that a *prior* to Alexander the
more ancient past existed (7). Marshall did not con
duct any excavations at these sites until much later. 51
conducted surveys nearby. By the time of his return,

he was convinced that Mohenjo-daro was of "remote antiquity" (7). This idea was partially con
Mohenjo-daro was known as the site of a
Harappa. He firmed by the discovery of inscribed seals, of a type poorly preserved Buddhist stupa, situated on the
that had been found in Harappa. In correspondence mound's summit, but during explorations here R. D.
with Marshall in 1923, Banerji described the seals Banerji had picked up a flint scraper, suggesting the
as "identical" to those found at Harappa. Later, he
mound had far greater antiquity; he therefore began
also compared some of the ceramics from Mohenjo
excavations here in 1922. Mohenjo-daro alsodaro with those at Nal that Mockler and others had seals belonged to a time yielded seals inscribed with unknown characters,
discovered. Even though we know now that the Nal
comparable to those from Harappa, and, like Harappa, the site was found to have a great depth

ceramics predated Mohenjo-daro, they did contribute to the early stages of settlement that led up to Indus cities. Clearly he was on the right track. He also used the term "prehistoric" to signify a culture (presumably unknown) in his descriptions of Mohenjo-daro. Though he had identified writing on the seals, it was undecipherable, therefore, preliterate. Banerji's attempts to link up the artifacts at Mohenjo-daro with others that had been discovered at Harappa was a key point. In the same year, M. S. Vats, one of the principal excavators at Harappa, who had also worked at Mohenjo-daro, made similar comparisons. In correspondence with Marshall, he noted the similarities of the !seals and script. He also compared vari

ous ceramics, brick sizes, terracotta figu! rines, clay bangles, and sling balls at Mohenjo-daro to those he had seen at Harappa.

By the summer of 1924, Marshall knew that there was something important at the two sites. Determined to get to the bottom of this riddle, Marshall called for a meeting with Banerji and Sahni, who had excavated at Harappa and arranged to ship excavation plans, drawings, and artifacts to a central place for their joint discussion. The body of data they examined included representative artifacts from Harappa (7). A meeting of this sort is an archaeologist's dream, sorting through materials and drawing on the knowledge of several experts, especially in this case because what was being discovered was emerging as an entirely new and unknown culture. The size of the sites and strong similarities among them suggested they were dealing with something as yet largely unknown but of great significance. Marshall and his colleagues knew that they were now onto something big - an entirely new civilization of the Bronze Age, dating to the time of the Sumerians and Dynastic Egypt.

Writing for the *Illustrated London News* some days later, Marshall boldly stated: “Not often has it been given to archaeologists, as it was given to Schiemann at Tiryns and Mycenae, or to Stein in the deserts of Turkestan, to light upon the remains of a long-forgotten civilization. It looks, however, at this moment, as if we were on the threshold of such a discovery in the plains of the Indus”

“Up to the present our knowledge of Indian antiquities has carried us back hardly further than the third century B.C. Of the long ages before the coming of the Greeks and the rise of the Maurya dynasty, of the birth and growth of civilization in the great river basins; of the cultural development of the races who one after another have poured into the peninsula from the north and west — of these and other problems relating to that dim and remote past, archaeology has given us but the faintest glimmerings; for almost the only remains of those early times that have come down to us have been rough implements of the stone and copper ages,... Now, however, there has unexpectedly been unearthed, in the south of the Punjab and Sind, an entirely new class of objects which have nothing in common with those previously known to us, and which are unaccompanied by any data that might have helped us to establish their age and origin . . To what age and to what people do these

FIRST LIGHT ON A LONG-FORGOTTEN CIVILISATION:

NEW DISCOVERIES OF AN UNKNOWN PREHISTORIC PAST IN INDIA.

By SIR JOHN MARSHALL, Kt., C.I.E., Litt. D., Director-General of Archæology in India.

NOT often has it been given to archæologists, as it was given to Schliemann at Tiryns and Mycenæ, or to Stein in the deserts of Turkestan, to light upon the remains of a long-forgotten civilisation. It looks, however, at this moment, as if we were on the threshold of such a discovery in the plains of the Indus.

Up to the present our knowledge of Indian antiquities has carried us back hardly further than the third century before Christ. Of the long ages before the coming of the Greeks and the rise of the Maurya dynasty; of the birth and growth of civilisation in the great river basins; of the cultural development of the races who one after another poured into the peninsula from the north and west—of these and other problems relating to that dim and remote past, archæology has given us but the faintest glimmerings; for almost the only remains of those early times that have come down to us have been rough implements of the Stone and Copper Ages, groups of prehistoric graves in the south of the peninsula, and some rude cyclopean walls at Rajagriha in Bihar. On the other hand, from the third century B.C. onwards, we have, on the whole, a fairly clear idea of man's handiwork in general; of his religious and domestic architecture, of his formative arts, of his weapons and utensils, of his personal ornaments and his jewellery, his coins and gems, and of the scripts which he used in his writing. And whenever it happens that new antiquities come to light—no matter to what race or religion they may belong—it is invariably possible to assign them with confidence and within relatively narrow limits to their respective age or class.

Now, however, there has unexpectedly been unearthed, in the south of the Panjab and in Sind, an entirely new class of objects which have nothing in common with those previously known to us, and which are unaccompanied by any data that might have helped to establish their age and origin.

The two sites where these somewhat startling remains have been discovered are some 400 miles apart—the one being at Harappa in the Montgomery District of the Panjab; the other at Mohenjo-Daro, in the Larkana District of Sind. At both these places there is a vast expanse of artificial mounds, evidently covering the remains of once flourishing cities, which, to judge from the mass of accumulated débris, rising as high as 60 ft. above the level of the plain, must have been in existence for many hundreds of years. Such groups of mounds abound in the plains of the Indus, just as they do in Mesopotamia and the valley of the Nile; and they are specially conspicuous along the banks of the old, dried-up beds of the main stream and its tributaries, not only in Sind, but in Bahawalpur State and in the Panjab.



UNEARTHED DEEP DOWN BELOW THE BUDDHIST MONUMENTS OF THE SECOND CENTURY AT MOHENJO-DARO: MUCH EARLIER REMAINS—A STAIRCASE OUTSIDE A SHRINE, WITH A CONDUIT COVERED BY MARBLE SLABS (IN THE FOREGROUND).

Photograph by the Archæological Survey of India, Western Circle. By Courtesy of Sir John Marshall.

The opportunities for excavation, therefore, in this part of India may be regarded as almost limitless; and, when it can be carried out on thorough and systematic lines, there is no doubt that the field will prove a peculiarly fertile one. Up to date, however, the meagre resources at the disposal of the Archæological Department have permitted it to undertake little more than preliminary trial-digging on these two sites; and it goes without saying that the remains disclosed are correspondingly limited. Yet, such as they are, they are full of promise.

At Mohenjo-Daro, the main street of the old city can still be discerned as a broad highway running from the south bank of the river towards the south-east, with houses fringing it on either side. What is surmised by the discoverer, Mr. Banerji, to have been the royal palace, stood at the point where this road emerged on to the quays of the river side. Opposite to it, in the now dry bed of the river, are several islands from which rose the principal shrines of the city, the highest and, no doubt, the chief of them all, being a massive Buddhist *stupa* raised on a high oblong platform, and surrounded by subsidiary shrines and monastic quarters. These remains belong to about the second century A.D., when the Kushans were paramount in the north-west of India; and, judging by the finds already made—particularly the urn burials, remnants of painted frescoes inscribed in Brahmi and Kharoshthi characters, new types of coins and other novel objects—there can be no doubt that their further exploration will result in welcome light being thrown on this very obscure period of Indian history.

Valuable, however, as these remains are likely to prove, it is not in them that the real interest of Mohenjo-Daro centres at the moment. Deep down below the Buddhist monuments described above, or at other parts of the site appearing close to the surface itself, there are at least two other strata of buildings belonging to much earlier epochs, and containing a variety of brick structures—the character and antiquity of which can at present only be surmised. Among these older structures one group is especially worthy of mention. Besides various halls and passages and chambers, it includes a massive structure—apparently a shrine—with walls seven or eight feet thick, pierced by several conduits which, in the opinion of the excavator, served for carrying off the lustral water when the shrine or image within it was washed. In another part of the same group is what appears to be an altar built of small glazed bricks, and provided with a drain of similar brickwork. Some idea of the appearance of these early buildings, and of their present state of preservation, is afforded by two of the photographs reproduced, the one (on this page) showing a staircase to the south-west of the shrine referred to, with a conduit in the foreground from which the covering of marble slabs has been removed; the other (on page 529), illustrating the glazed-brick flooring in a bay on the western façade of the same shrine.

At Harappa, Mr. Daya Ram Sahni's excavations disclosed as many as seven or eight successive levels, demonstrating the long and continuous occupation of the site during many hundreds of years prior to the third century B.C.; and throughout most, if not all, of this long period, burnt brick of a good quality was used for building purposes. The site at Harappa, however, has suffered much from the depredations of railway contractors and others, and the structures brought to light are in a more fragmentary condition than at Mohenjo-Daro. On the other hand, the smaller antiquities are generally identical in character with those from Mohenjo-Daro, and some of them even are better preserved. These smaller antiquities from the two sites comprise new varieties of potteries both painted and plain, some fashioned by hand and some turned on the wheel; terra-cottas; toys; bangles of blue glass, paste and shell; new types of coins or tokens; knives and cores of chert; dice and chessmen; a remarkable series of stone rings; and, most important of all, a number of engraved and inscribed seals. Iron does not occur at all, except in the latest deposits, and metal objects of any kind are scarce, particularly at Harappa.

Of all these antiquities the most valuable are the stone seals, not only because they are inscribed with legends in an unknown pictographic script, but because the figures engraved on them, and the style of the engraving, are different from anything of the kind hitherto met with in Indian art. Some of them are of steatite, others of ivory, and others of stone and paste. In shape most are square and provided at the back with a boss pierced with a small hole for suspension. The animals engraved on them are in some instances bulls; in others, unicorns; but it is to be observed that neither the Indian humped bull nor the water-buffalo occurs among them.

As to the strange pictographs which do duty for letters, three points are worthy of remark: first, that the marks (apparently vowel signs) attached to many of the pictographs indicate a relatively high stage of development; secondly, that some of the inscriptions from Mohenjo-Daro betray a later stage in the evolution of the script than those from Harappa; thirdly, that they bear no resemblance whatever to any ancient Indian alphabet known to us; but, on the other hand, they do bear a certain general affinity to pictographs of the Mycenæan age in the Mediterranean area, though it is not possible to point to any of the symbols as being actually identical.

Examples of this pictographic writing are found not only on the seal dies, but also (at Mohenjo-Daro) on certain oblong bars of copper which their discoverer assumes to have been coins, since they are similar in shape to the early Indian oblong coins known as "punch-marked," though they do not correspond in weight with any recognised standards used in ancient India. Should this assumption of Mr. Banerji's prove correct, it would mean that these coins may turn out to be the earliest in existence, since the first coins hitherto known to have been struck in any other country are the Lydian pieces of the seventh century B.C.

Notwithstanding that the various ring stones mentioned above have been found in large numbers on both sites, the purpose to which they were put has hitherto quite baffled the ingenuity of the excavators; though, for reasons into which it would take too long to enter here, Mr. Banerji believes that they were in some way connected with the *Bhartaris*, or shrines of eternal fire. They are of all sizes, from that of a small napkin ring up to fifty pounds in weight, and are made of various coloured stones or marble; but what is particularly curious about them is that in many specimens the upper and lower surfaces are undulating.

Another remarkable and significant feature at the Mohenjo-Daro site is the character of the burial customs. In the earliest period the practice was to bury the body in a hunched position in a brick tomb, generally of square or oblong form. Later on (it may be very much later), the custom obtained of burning the body, as is commonly done in India to-day, and depositing the ashes in a small urn, which, along with two or three others, was placed inside a larger round jar, accompanied by several miniature vessels containing food, raiment, and so on.

To what age and to what people do these novel antiquities belong? Those are the two questions which will naturally occur to the reader, and to which a score of different answers may perhaps suggest themselves. As to the first question, all that can be said at present is that the period during which this culture flourished in the Indus valley must have extended over many centuries, and that it came to an end before the rise of the Maurya power in the third century B.C. So much may be inferred, on the one hand, from the many successive strata of habitation, particularly on the Harappa site; on the other, from the presence of copper weapons and

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novel antiquities belong?”

Large numbers of photographs accompanied Marshall's article. Soon after its appearance, scholars responded to the news. In a return note to the *News*, Archibald Henry Sayce who was conversant in ancient languages and archaeology wrote that the remarkable discoveries that Marshall wrote

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about were even more remarkable and startling than he supposes. “The inscribed seals or plaques found at Harappa and Mohenjo-daro are practically identical with the Proto-Elamite tablets discovered by DeMorgan at Susa [in Mesopotamia]. The form and size of the plaques are the same, the unicorns are the same, and the pictographs and numerals are also the same. The identity is such that the seals and tablets might have come from the same hand” (8).

Later two other scholars, C. J. Gadd and S. Smith, concurred with what Sayce had written and offered a chart comparing certain signs from the Indus with those of Mesopotamia. Although neither Sayce nor Gadd and Smith were implying that the

Indus was derived from these other cultures, they
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the architecture at Harappa, so the B%(1-& %,EE(0D& #/*& *$2"%,>$*& ?41#& ,'& "#$&

main efforts were in Sindh, where /%1#("$1"4%$&/"&F/%/99/<&2,&"#$&?/(0&$",%"2&+$%$&(0& =(0*<& +#$%$& G/,& B/#/*4%& A/2#(0/"#& H/%/>/0&Dikshit took charge of the excavations I(-2#("&at Mohenjo-daro in 1924-25. Dikshit

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did a great deal of digging during this

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huge undertaking, directed by Mar

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at the site. By the end of the season 04?$%,42& /%"('/1"2& *(21,.$%$*7& Q,%& $:/?9)$<& "#$>& significant portions of the Lower Town ',40*& "#$& 2,N1/))$*& R%($2"N

had been opened, plans of ,0)>& 2$/2,0& ,'& $:1/./"(,0& /"& "#$& 2("$<& E4"& #$&many *(21,.$%$*& "#$& S%$/"& B/"#<& 24%$)>& ,0$& ,'& "#$& ?,2"&buildings drawn, and numerous arti2(D0('(1/0"&'(0*2&(0&/))&,'&"#$&*(DD(0D&/"&30*42&2("$27&&facts discovered. For example, they

found the so-called Priest-king. It was
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gram, Sir John Marshall had many

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members were not properly trained. It
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was clear that the work at Mohenjo

#$& +,%-$*& 40"()& JKJW7& P/"$%& ,0<& #$& 2$%.$*& (0& "#$& /%?>& (0& R/)$2"(0$<& *(*& 2,?$& *(DD(0D& /%,40*& "#$&daro needed someone educated in R$%2(/0& S4)'<& /0*& E%($')>& +,%-$*& /2& "#$& 142",*(/0&liberal arts, especially the history of

,'& /0"(U4("($2& (0& "#$& @(**)$& V/2"7& I4%(0D& #(2& $0D/D$?$0"& /2& /& '($)*& *(%$1",%& ,'& "#$&
ancient civilizations, and be familiar he drew ecological parallels with Pharaonic Egypt

and Mesopotamia. All were positioned on great river tracts with fertile soils, unfailing water supplies, and water transport for ease of communication (7).

ThecitiesofMohenjo-daroand Harappa were nearly 500 miles apart. Comparable mounds of ruined buildings were to be seen throughout the plains. These sites offered, as Marshall lamented, almost limitless scope for investigation, if only the resources were available. Despite their strained circumstances, by the mid-1930s, the staff of the Archaeological Survey had undertaken excavations and survey work that uncovered Indus

sites as far afield as Kotla Nihang in east Punjab ()*+,-$./%,0%12$%3456*%7)-)8)9"1),4!
and it was clear that the Indus Civilization was con

contemporaneity. The effect was dramatic: "At one stroke the history of India had been pushed back by 2,000 years and placed on a par with the histories of Egypt and Mesopotamia" (13). Once this link between the Indus region and the 3rd millennium BC Mesopotamia had been spotted, many more examples of similar material, particularly seals and beads of etched carnelian and other materials, were noticed. Not only did these provided clues to the age of the Indus Civilization but they also revealed its well-established trade links with the world of the first Mesopotamian civilization.

Marshallcontinuedto share news of his finds with the readers of the *Illustrated London News*. On February 27, 1926, he wrote: “At the moment of writing I am starting on the systematic excavation of Mohenjo-daro with 800 laborers, five officers besides myself, and an adequate number of technical assistants. Later on, our operations will be extended over the Punjab, Western Rajputana, and Baluchistan, and this will embrace a general survey of the remains of this remarkable civilization. ... To the archaeologist the site of Mohenjo-daro is one of the most fascinating that can well be imagined....

The existence of roomy and well-built houses, and
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with the ways and means of archaeological reT/?*/"&H/2%&/0*&(?9,%"/0"&=4?$%(/0&1(">&,'&A(2#<&@/1-/>&*$?,02"%/"$*&/0&(0"$%$2"&(0&

the relatively high degree of luxury denoted by their &

elaborate system of drainage, as well as by the character of many of the smaller antiquities found within, seem to beyond a social condition of the people far in advance of what was then prevailing in Mesopotamia and Egypt."

Unable to state the age of the civilization, he went on to observe that the Indus (which he named after the river system) artifacts differed from any known other civilizations in the region, though

search. Dikshit, as his later career at the ASI shows
and his subsequent publications confirm, was not
!"#$%%&'%
that man. Marshall, therefore, brought in Ernest

John Henry Mackay. He was a veteran archaeologist when he joined the ASI in 1926. He had been trained in field archaeology by Sir Flinders Petrie in Egypt, where he worked until 1916. Later on, he served in the army in Palestine, did some digging around the Persian Gulf, and briefly worked as the custodian of antiquities in the Middle East. During his engagement as a field director of the Oxford University Archaeological Expedition to Mesopotamia, where he excavated Jamdat Nasr and important Sumerian city of Kish, Mackay demonstrated an interest in the Harappan Civilization in his correspondence with Marshall and in a paper on Indo

()*+,-$./%,0%12$%3456*%7)-)8)9"1),4!

Sumerian connection. Mackay arrived in 1926 and Sumerian period in Mesopotamia! This was certainly a tremendous leap backwards in the antiquity of civilization within the South-Asian subcontinent, which before the large-scale excavations at Mohenjo-daro was thought to have a confirmed limit only as early as the third century B.C., or an unconfirmed limit going back at best to the twelfth century

did his digging at Mohenjo-daro till 1931 when!"#$%&'&((&)$*+,+-
+.&!+/)$+)$"+0$1/"#0(/)2#)1#$3+!"$4&'0"&--$&)2$+)$&$(&(#'$/)$5)2/6B.C. as estimated by the scholars of the Vedic tradibudget constraints stopped all"non-essential tions. In a rare coincidence during the 1920s Ur in789#'+&)$1/))#1!+/):$4&1;&<$&"+,#2$+)$=>?
@$&)2$2+2$"+0$2+AA+)A$&!$4/"#)B/2&'/$!+--$
work". This brought to an end the major excavations 6 Mesopotamia and Mohenjo-daro in the Indus valley

at Mohenjo-daro. Some small-scale work continued, were being excavated at the same time, under the!"#$9&B/'$#C1&,&!+/)0$&!$4/"#)B/2&'/:$7/9#$09&--601&-#$3/';$1/)!+)8#2D$"/3#,#'D$8($
!/$=>E@:$$however, up to 1936. leadership of two equally talented British archaeThe Marshall's investigations culminated in ologists, Leonard Woolley and John Marshall, who

,/-89#0F$
the publication of his report (in three volumes) *Mo*were to be knighted for their successful enterprises.
!"#$%&'"()"*(%'*+#$,%'-.*/010203(+0"%4*
henjodaro and the Indus Civilization. Mackay pub$4&1;&<$(8G-+0"#2$"+0$H+)2+)A0$8)2#'$The tight bonds of the ancient past

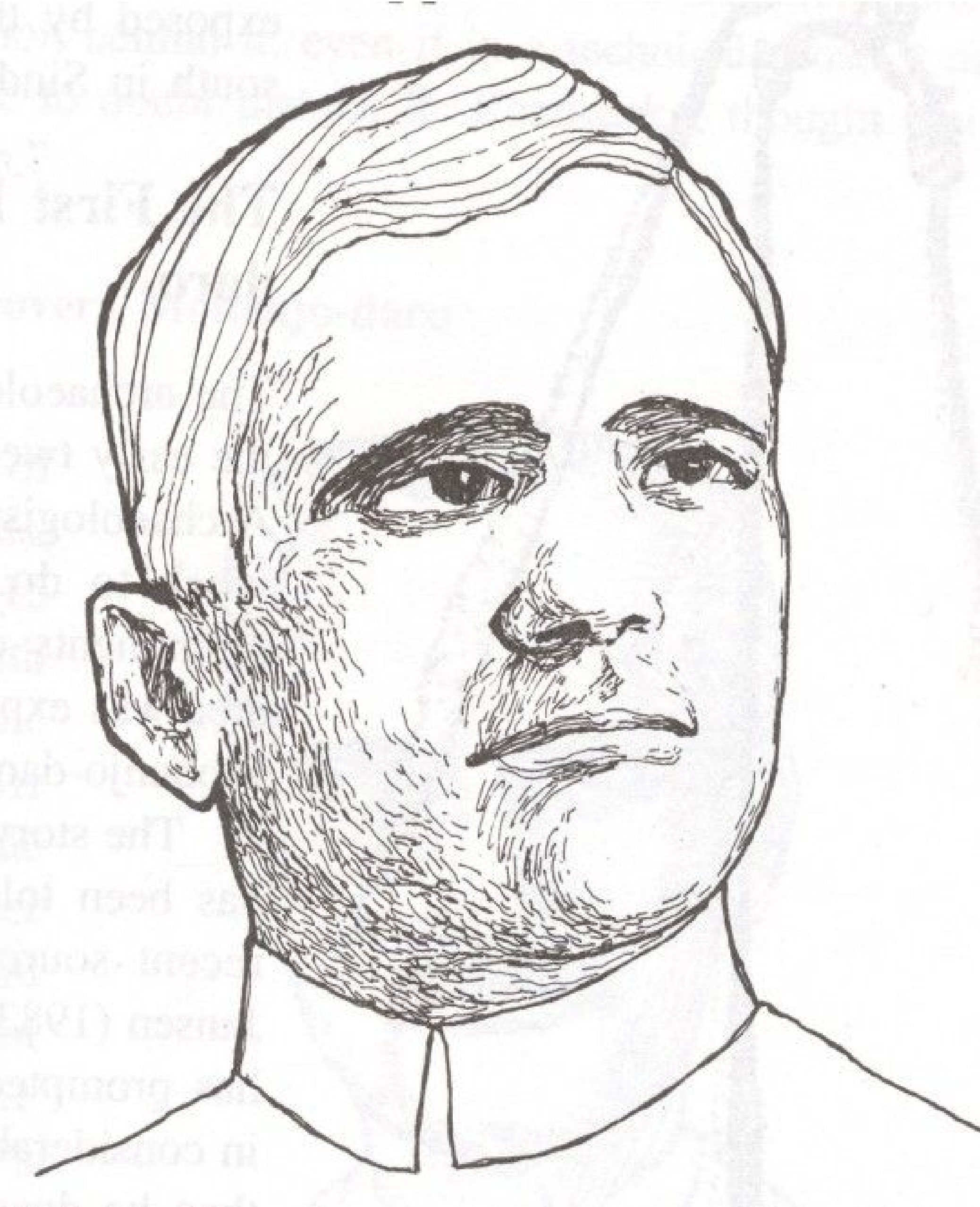
with Biblical *5-)+#$)* 678(1(+0"%.* (+* !"#$%&"'()"** I+)$!3/$,/-89#0FD$ H/--/3#2$ G<$ &$ 09&--$ (/(8-&'$studies that had justified the first involvement ofG//;$8)2#'$!"#$!+!-#$/H$$lished his findings under *Further Excavations at ,%'-.*/010203(+0"%4**J"#0#$(8G-+1&!+/)0$&'/80#2$A'#&!$#C1+!#9#)!$European institutions in the 19th century were bro

Mohenjodaro (in two volumes), followed by a small
popular book under the title of
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Indus Civilization. ken forever.
18-!8'#$$&!$%&'&((&$3&0$+)$H&1!$&)$#C!#)0+,#$1+,+-+.&!+/)$0('#&2$/,#'$!"#$3"/-#$#C(&)0#$
These publications aroused great ex
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citement in the scholarly world. What
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had appeared in the early days to be a
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was in fact an extensive civilization
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large tributaries.P:*:$ 1/"#0(/)2#2$!/$!"#$ *-&00+1&-$ 789#'+&)$ (#'+/2$ +)$ 4#0/(/!&9+&Q$ J"+0$ 3&0$ 1#'!&+)-<$ &$!#9#)2/80$ -#&($
The discovery of this hither to
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fore civilization on the banks of the
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Indus took the archaeological world by
The excavations at Ur#C1&,&!+/)0$ &!$ 4/"#)B/2&'/$ 3&0$!"/8A"!$!/$ "&,#$ &$ Woolley, almost
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great sensation among Old World ar

chaeologists. Writing elsewhere, Mar5)$ &$ '&'#$shall had averred that 'the discoveries !"#$ =>?O0$ T'$ +)$

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daro and The Indus Civilization,
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H/'#,#':$ zation on the banks of the lower Indus



and of its twin river the Mihran is a
$ new discovery" (26). Indian subconti
nent thus took its rightful place, along

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with Mesopotamia and Egypt, as an
area where 'civilizing processes were!"#$%&'%
initiated and developed'.

A typological study of the cultural assemblage at Harappa, Mohenjo-daro and some other places, such as Chanhu-daro in Sindh, suggested an age from 2500 to 1500 B.C. This was a tentative estimate only of the mature phase of the civilization with no definite clues to its time of origin. The 2500 years B.C. corresponded to the Classical Marshall saw this civilization as the

Indus Valley's distinctive indigenous development, comparable with but not related to the contemporary Sumerian civilization in the Tigris-Euphrates Valley, though there were strong links between them. The relationship of the Indus Civilization to the Vedic Aryans, the people who had composed India's earliest surviving literature, was already being considered and in several publications R. P. Chanda, one of Marshall's officers, set forth arguments that the Indus Civilization had possessed a non-Vedic culture, that its cities had been destroyed by the Vedic Aryans, but the Indus religion survived this destruction and underlay much of later Indian beliefs and practices. Marshall in his 1931 publication on the Indus Civilization endorsed these views. Gordon Childe a few years later noted the scarcity of any architecture that could be identified as a temple or monumental tomb which indicated the absence of any organized religion like that in Mesopotamia. He also noticed the elaborate drains and planned urban layout as a distinctive feature of the Indus Civilization.

By the mid-1930s, excavations and survey work had revealed Indus cities as far afield as Kotla Nihang Khan in east Punjab and Rangpur in Saurashtra, where Vats believed the

Indus occupation to have been later than that at Mohenjo-daro or Harappa. Aurel Stein explored the dried-up riverbeds of Bahawalpur, revealing a number of Indus sites. As stated earlier, it was becoming clear that the Indus Civilization was considerably larger in extent than the other states of this time: Old Kingdom Egypt and the Akkadian and Ur III empires in Mesopotamia.

A Broader Horizon: The spectacular finds at Mohenjo-daro generated a lot of interest in the archaeology of this newly discovered Bronze Age

()*+,-$./%,0%12$%3456*%7)-)8)9"1),4! civilization and a number of institutions from Europe
and America wanted to get involved in the explorations of ancient habitation in the form of the
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tions and excavations. One of the great institution important potsherds, which contributed so much to;4/% (.&%
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builders was Professor W. Norman Brown of the36@=7)4/(6'%6'0%5,6'%4'%ABCE9CG?%H,&=1)
(%(&%@41)(%6%I6/(%6-&='(%&2%-6(*,46@%&2%24,/(9,6(*%the archaeologist‘s knowledge of
ancient Pakistan. University of Pennsylvania. He visited Mohenjo4-8&,(6'7*% 2&,% @4'J4'1% ()*%
8,*)4/(&,>% &2% ()*/*% 6,*6/% .4()% ()*% &()*,% 6,*6/% &2% 6'74*'(%Aurel Stein located many
earlier sites in Baluchisdaro in 1928, where he met Ernest J.H. Mackay,74I4@4K6(4&'% 4'% 5,6'%
6'0% L*/&8&(6-46:% M)*/*% 24'0/% 6@/&%)*@8*0% (&% @4'J% ()*% 5'0=/%tan, such as
Periano Ghundai as well as the settleN4I4@4K6(4&'%.4()%/*I*,6@%8,*I4&=/%7=@(=,*/%
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then in charge of the excavations. Brown later rement of Dabarkot, which yielded some Indus period
cruited Mackay to be the field director of the Ameriremains, and a number of other sites, including
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can excavation at Chanhu-daro in Sindh. The excaKulli, where he identified the Kulli complex, related
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vation took place during to the Indus Civilization.

the 1935-6 field season Hargreave came a little later, and produced;6,1,*6I*% 76-*% 6% @4((@*% @6(*,?% 6'0% 8,&0=7*0% 4-8&,(6'(%
(14). It was funded by the
,*/=@(/:% ;4/%*+76I6(4&'/%6(%!6@% 4'% 36@=7)4/(6'% 8,&I*0%(&%be truly revolutionary. Harold

Nal, an early settlement in important evidence, which amplified Stein's own Museum of Fine Arts in
remarkable results. His excavations at Nal in Balu Boston, but it was H*%(,=@>%,*I&@=(4&'6,>:%
Brown's project; the pub
chistan proved to
Hargreaves dug at
sors of the Harappan urbanization. Stein's campaigns were essentially those of reconnaissance; he made few excavations beyond trenching sites here and there, and collected mainly surface indica

!"#$%&'($)*+,-$*)$&..#(.'*($/&-$0*"#(1*2&3*$4,.$5&3&66&$/&-$(*.$)*37*..#(8$9&"('$"&2$,(2#3.&:#($."3##$ -#&-*(-$ *)$ '(2#6#(2#(.$ #;+&<&.'*($ &.$ 5&3&66&$ 4#./##($ =>?@A?=$ &(2$ =>?BA?C8$!"#3#$/&-$(*$#;+&<&.'*($'($=>?CA?D$4#+&,-#$9&"('$/&-$+&EE#2$4F$0&3-"&EE$.*$ 0*"#3(1*2&3*$ &(2$."#3#$ /&-$ (*$ *(#$ #E-#$.*$+*(.'(,#$."#$ /*3:$ &.$ 5&3&66&8$ G4*,.$."'-$.'%#$0&2"*$9&3,6$H&.-$4#+&%#$."#$9,6#3'(.#(2#(.$G3+"&#*E*7'-.$)*3$."#$(*3."#3($+'3+E#$ &(2$-#..E#2$'($.*$&223#--$."#$.&-:$*)$#;+&<&.'(7$5&3&66&8$G.$."'-$-'.#I$"#$,(2#3.**:$#'7".$
-#&-*(-$ *)$ /*3:I$ /'"+"$ #;.#(2#2$."3*,7"$."#$ #(2$ *)$."#$ =>JJAJB$ -#&-*(8$ 5#$ #;6*-#2$

K"#($ H&.-$ 3#.'3#2$)3*%$ #;+&<&.'*($ &.$ 5&3&66&I$ -*%#$ /*3:$ +*(.'(,#28$ L8M89&-.3'$ 2'-+*<#3#2$&($N(2,-$+#%#.#3F$&.$5&3&66&$'($#;+&<&.'*($-O,&3#$PAJQ8$!"'-$+#%#.#3F$'-I$'($)&+.I$&($#;.#(-'*($*)$."#$6*-.A,34&($R#%#.#3F$5I$#;+&<&.#2$4F$H&.-8$PAJQ$2&.#-$.*$."#$ %'22E#$.*$ E&.#$ 6*3.'*(-$ *)$."#$ 0&.,3#$ 5&3&66&(I$ 4,.$ '.$ /&-$."#$)'3-.$ 0&.,3#$ 5&3&66&($ +#%#.#3F$.*$"&<#$4##($2'-+*<#3#2$&(2$'-$-.'EE$."#$E&37#-.8$!"#3#$'-$(*$+#%#.#3F$:(*/($$&.$ 0*"#(1*2&3*I$ &E."*,7"$ -.3&F$ 4,3'&E-$ &(2$ *."#3$ '(.#3#-.'(7$ ",%&($ -:#E#.&E$)'(2-$ &3#$

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M)*% 3,4(4/)% 6'0% O-*,476'% 6,7)6*&@&14/(/% 040% '&(% ()4'J%

lication of the results apsouthern Baluchistan, while at Amri in Sindh, N. G. pearing shortly before-=7)% &2% ()*% 4'041*'&=/% 5'046'% 6,7)6*&@&14/(/% H*>&'0%Majumdar excavated the first town in the Indus ()*4,%/=8*,I4/&,>%,&@*%4'%()*%24*@0.&,J:%M&%6%@6,1*%*+(*'(?%

Mackay's death in 1943. plains known to have belonged to the pre-Indus

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The Chanhu-daro excaperiod. He also identified a degenerate phase of the*+7*8(4&':% ;*% 76,,4*0% &=(% 6% 7&-8,*)*'/4I*% /=,I*>% &2%

vations are important for civilization at a number of sites, including Jhukar,F4'0% 6'0% ()*% 5'0=/% 8@64'% H* (.**'% ABCE% 6'0% ABQA?%

two reasons. First, the after which the post-Harappan period in Sindh is

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seal-making workshops L&)*'<&06,&?% 6'0% ='0*,(6J4'1% 7*,(64'% I*,>% 4-8&,(6'(%The British and American archaeologists did gives us important in*+76I6(4&'/:% ;*%)60% 4'4(46(*0% 2,*/)% 24*@0.&,J% 4'% ABQG%not think much of the indigenous Indian archaeolo

sights into Harappan

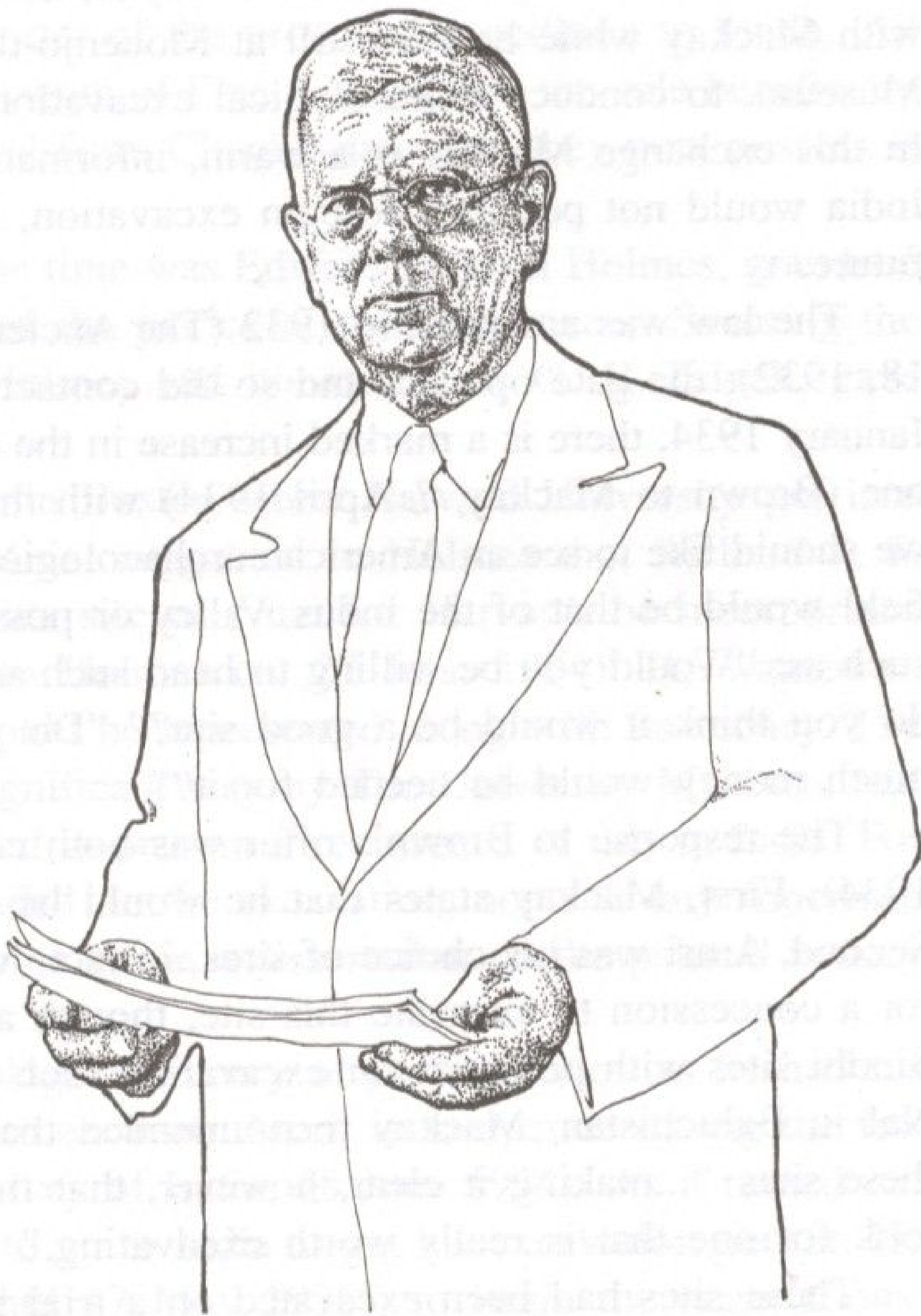
.)*'%)*%.6/%J4@@*0%H>%H6'04(/%4'%()*%R4,()6,%;4@@/:% gists beyond their supervisory role in the fieldwork. technology. The excavaTo a large extent, this assessment was right butF40*% H>% /40*% .4()% ()*% 7&@@*7(4&'% &2% -6(*,46@% 4'% $='<6H?%
tion also recovered the N.G. Majumdar was an exception. He carried out aF4'0%6'0%36@=7)4/(6'?%'*.%.&,J%.6/%H*4'1%76,,4*0%&=(%4'%

post-urban phase, Jhukar comprehensive survey of Sindh and the Indus plain&()*,% 7&='(,4*/% &2% "*/(% O/46:% 5,6'% 4'% 86,(47=@6,% .6/% >4*@04'1% =8% ()*% /*7,*(/% &2%)*,% :"01$.%!,**$28 ;%%%%%%%%%%%%%%%%%%%%%%%%material, even though between 1927 and 1931, defining the extent of the Mackay did not do as 4'0*26(416H@*% F4,% O=,*@% F(*4'% -60*% 6%'&(*.&,()>% /*,4*/% &2% *+8@&,6(4&'/% 2,&-% #6,/% (&%minor prehistoric settlements within the area domi%good a job of excaS6J*% T,*-46?% .)47)% 24@@*0% 4'% ()*% 1*&1,68)476@% H67J1,&='0% 2&,% ()*% 04/(,4H=(4&'% &2%nated by the cities of Harappa and Mohenjo-daro, vation and recording7=@(=,*/%2&='0%4'%/(,6(424*0%7&'(*+(/%4'%()*%*+76I6(4&'/:%U'%()*%H6/4/%&2%()*/*%04/7&I*,4*/?%and undertaking certain very important excavations. this material as he$ He had initiated fresh fieldwork in 1938 when he might have (12).-6(*,46@%&2%6'74*'(%$6J4/(6'%4'%4(/%,*@6(4&'%(&%()*%&()*,%7=@(=,*/%&2%()*%-&/(%6'74*'(%V6/(:%was killed by bandits in the Kirthar Hills.

Concurrently The short inscriptions on the Indus seals and with the above largeM)*,*%.*,*%*+(*'/4I*%*+76I6(4&'/%6(%(.&%-6<&,%74(4*/%6'0%&'*%/-6@@%(&.'?%(,46@%(,*'7)*/%on a few copper bars from Mohenjo-daro that Banscale excavation0=1%4'%/*I*,6@%/4(*/%4'%F4'0%6'0%36@=7)4/(6'?%6'0%6%264,%40*6%&2%()*%1*&1,68)476@%*+(*'(%&2%erji at first compared to Indian punch-marked coins work, that great ex()*%I6,4&=/%8,*)4/(&,47%7=@(=,*/%,*@6(*0%(&%()*%5'0=/%N4I4@4K6(4&':%#&,%()*%67)4*I*-*'(/%&2%attracted considerable interest, and an attempt at plorer of Western()4/%24*@0.&,J?%='0*,%6,0=&=/%7&'04(4&'/%6'0%4'%042247=@(%(*,,64'?%&'*%76'%)6I*%'&()4'1%decipherment of the script was made as early as Asia, Sir Aurel Stein,H=(%8,64/*?%H=(%='2&,(='6(*@>%()*%/6-*%76''&(%H*%/640%&2%-=7)%&2%()*%*+76I6(4&'?%.)47)%1925, by Colonel L. A. Waddell. In the years that undertook to survey /)&=@0%8,&I40*%=/%.4()%()*%*//*'(46@%H67J1,&='0%2&,%&=,%/(=0>%&2%()*%5'0=/%N4I4@4K6(4&'%followed, further efforts were made, based on comthe little-known ar6'0%()*%V6,@>%5'0=/%/*((@*-*'(/:%$411&((%4/%W=4(*%*-8)6(47%4'%)4/%7,4(474/-X%/&-*%&2%4(%4/%parisons between Indus signs and those of the

eas of Baluchistan4'%267(%4'*I4(6H@*%6'0%'*7*//6,>:%O77&,04'1%(&%)4-?%&2%()*%H,&60%267(/%&2%(&.'98@6''4'1?%

and the Pashtun



country on the ex!"#$%%&'%
Sumerian, Minoan, Etruscan, Hittite, and Brahmi scripts, and even Easter Island *rongo-rongo*. None produced a successful result. A question of key imtreme western edgeA2&3*$
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two journeys, in

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North Baluchistan
and the present-day province of Pakhtunkhaw in
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28, brought to light a vast amount of material of
first-rate importance for linking the prehistory of
these areas with the other areas of ancient civiliza
!"#$%&'%tion in Iran and Mesopotamia. These finds also

helped to link the Indus Civilization with several
previous cultures that later proved to be the precur
portance in decipherment of the script was what language it rendered: Marshall was of the opinion that the languages spoken in the Indus Civilization were likely to have been members of the Dravidian family.

Exploration also took place in areas beyond the Indus plain and similar kinds of enigmatic discoveries were made in the remote region of Baluchistan. In 1876, Major E. Mockler excavated at the site of Sutkagen-dor near the coast and to the west of the Indus Valley, at a site now known to have been an Indus port of trade. Twenty-five years later an explorer, Hughes Buller, discovered the site of Jhalawan area. The pottery produced at Nal is

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Harappan Civilization - The Material Culture
decorated in complex geometric patterns and in a
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(15). But the times and political circumstances were
variety of colors. This type of polychrome pottery
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not receptive to the spirit of the report and it was
was previously unknown and given its distinctive
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qualities made for easy comparisons when found,##+&D51&"!$9*$%&,3&F*$)'*--0&F*2G*30&*+%&E'(-
%#7&Mortimer Wheeler as the Director General of Archaeology, the years 1944-48 represented, per
haps, the most decisive single period in the century
elsewhere. Other fieldwork revealed other antece
dents of the Indus Civilization. #.#+& ,#/5+& 1!& #H2*.*1#& 1'#$#7& >#&)*9& (+& 1'#& AC&
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old history of archaeology in South Asia, more par
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Punjab, Sindh and Baluchistan in Pakistan, new
ticularly in the area that later took the shape of

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F#)!D!1*4(*+& work was being carried out in other countries of Pakistan.
West Asia. Iran in particular was yielding up the seWheeler‘s brilliant insight into the problems

chaeology,
crets of her prehistory to the excavations of the
the years 1944-48 represented, per
haps, the most decisive single period in the centuryFrench and Americans in the 1930‘s, and the inde

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confirmed and enlarged upon the earlier report by fatigable Sir Aurel Stein made a noteworthy series
Woolley. One of his old history of archaeology in South Asia, more par

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insight into the problems *))54#%&&I&&1'#&-!$%)&!"&>*$*DD*&*%4(+
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Gordon Childe was already making a penetrating

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synthesis in 1930‘s of the material of ancient Pakidirections
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stan in its relation to the other cultures of the most D$(+2(D-#& 9(1'& 1'*1& !"& 1'#& !1'#$$& /$#*1& $(.#$(+#&Survey
ancient East.which remained his focus of attention for some time.

He worked in many directions to bring the Survey &*+#(& <)35,!'$*& ,-& $,8'"& ,=<#$!!,2$& 2(5)=$!& 3$"1$$-& DEFD& +-*& DEGF& 4+--("%& ,-& +55&

Sir Mortimer Wheeler: In 1944, Sir Mortimer had laid out, but the



along the path he had laid out, but the keystone ofWheeler, who had already a distinguished career in.+,#-$!!%&3$&!+,*&"(&+<<# (+4'&"'$&+#4'+$(5(8,4+5&!"+-*+#*!&!$"&,-&H)#(<$+-&+#4'+$(5(87&

the plan was a series of training excavations. These
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was a series of
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as Director General of the Archaeological Survey. **&were the forums within which**

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By then, the Survey had become run-down in the These were the fo

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Depression years of the 1930s and the succeeding rums within which

allowed him to spot talents and bring it along. These *,)!-51#&D!9#$&"$!4&19!&4* (+&)#*1)&!"&/!.#$+4#+10&

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he tutored new
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produced a small cadre of competent field archae

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ent states, India and Pakistan. The establishment of

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excellent work done under it in subsequent years

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Wheeler trained in his field schools.

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One of his main objectives was training the rising generation of Indian archaeologists in the field





&

Sir Mortimer Wheeler

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methods that he had perfected in Britain and$33&37&DEFN&"'+"&
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tural layers, rather than by the artificial levels fa

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careful recording of stratigraphy. On his first visit,

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Wheeler was struck by the AB mound at Harappa,
which he immediately interpreted as a fortified cita
del, evidence that the Indus Civilization was not

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("&the old Archaeological Survey of India had reached impressive gateways. The
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sought. Sir Leonard Woolley, the British archaeoloduring which, in Wheeler's view, it acquired a morecadre of competent field archaeologists, which later

gist of Near East fame, was summoned to assess +<<(,-"=$-"& (.& I,#& /(#",=$#& J'$$5$#& +!& "'$& L,#$4"(#& S$-$#+5& (.& K#4'+$(5(87%& & "'$&fanned out into government service and universities
the problems and make recommendations for reviThese excavations included a deep trenchof the two newly independent states, India and 7$+#!&DEGGCGN&#$<#$!$-"$*%&<$#'+<!%&"'$&=(!"&*$4,!,2$&!,-85$&<$#,(*&,-&"'$&4$-")#7C(5*&talizing the Survey. His report has been described cut down to natural soil, providing a stratigraphicPakistan. The establishment of the Pakistan De
as a monument of quick and penetrating vision and',!"(#7& (.& +#4'+$(5(87& ,-& I()"'& K!,+%& =(#$& <+#",4)5+#57& ,-& "'$& +#$+& "'+"& 5+"$#& "((6& "'$&partment of Archaeology and the excellent work was of key importance. The first occupation hereof trenchant but judicious and constructive criticism

done under it in subsequent years owes to a large

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extent to the young archaeologists Wheeler trained 56
in his field schools.
One of his main objectives was training the

rising generation of Indian archaeologists in the fieldI)#2$7& 4(-.,#=$*& +-*& $-5+#8$*&)<(-& "'$& $+#5,$#& #$<(#"& 37& J((55$7?& U-$& (.& ',!& .,#!"&

included sherds resembling the pottery found in northern Baluchistan at sites such as Rana Ghundai, recently excavated by E. J. Ross. Pottery from different regions in Baluchistan had recently been studied by Stuart Piggott, who had identified several regional styles and who had compared these wares with pottery from the Indus Civilization on the one hand and with that from Iran and West Asia on the other.

Wheeler excavated a cemetery at Harappa, R-37, associated with the main occupation of the city, and he demonstrated that a time interval, represented by a considerable buildup of deposits, separated this cemetery from the burials in Cemetery H. Some of the latter were cut through derelict architecture; structurally poor buildings containing Cemetery H material also abutted the west side of the citadel mound. Wheeler saw the Cemetery H culture as intrusive and enthusiastically adopted a suggestion made by Childe that its makers may have been the Aryan invaders, thought by then to have arrived around 1500 BC. With characteristic vigor, he developed a theory that the Indo-Aryans were largely responsible for the demise of the Indus cities, quoting Vedic descriptions of the sack of *Dasa* fortresses and arguing that "[it] may be no mere chance that at a late period of Mohenjo-daro men,

women and children appear to have been massacred there ... On circumstantial evidence, Indra [the Aryan god of war] stands accused" (16,17).

After the partition of British India in 1947, Wheeler was for some years an archaeological adviser to the government of Pakistan and in 1950 conducted excavations at Mohenjo-daro, which yielded enough evidence of solid brickwork, including towers, to convince him that his identification was correct. He also fully uncovered the foundations of a large structure on the mound, previously identified as a *hammam* (steam bath), interpreting it as a Great Granary. These discoveries and interpretations allowed Wheeler and Piggott to formulate a picture of the Indus Civilization that has dominated popular understanding of the civilization to this day.

Mohenjo-daro and Harappa were seen as the twin capitals of a great state, ruled probably by priest-kings. Cities were thought to follow a standard plan, with a fortified citadel containing public buildings and a residential lower town, its streets constructed to a cardinally orientated grid plan resembling that of much later Hellenistic cities and towns. Great granaries were presumed to store grain that was raised in tribute or as taxes to be distributed to state employees, as in contemporary Mesopotamia.

A highly efficient and well maintained system of drains and sanitation was a standard feature of Indus cities. Standardization was also apparent in the Indus artifacts, such as the bead necklaces, stone and metal tools, and finely made pottery. Piggott thought these artifacts showed "competent dullness ... a dead level of bourgeois mediocrity in almost every branch of the visual arts and crafts" (6), though Wheeler commented favorably on the technical skills and aesthetic qualities apparent in some objects, such as the steatite seals with their lively depictions of animals. The overall picture was of a civilization in which considerable technical competence and a high standard of living were offset by cultural stagnation and the stifling effects of rigid bureaucracy and an authoritarian regime, continuing apparently unchanged for nearly a millennium.

Wheeler expected to find and looked for features that were familiar from other civilizations and that were thought to be among their defining characteristics: monumental public architecture such as temples; defensive works and weaponry; royal burials and palaces. The structures on the citadel mounds, such as the Granary and Great Bath at Mohenjo-daro, could reasonably be interpreted as public and religious buildings. The massive brickwalled citadels and their impressive gateways matched the expected defenses and fortifications. Metal objects, such as spearheads, daggers, arrowheads, and axes, were potentially weapons, though Wheeler noted that "a majority may have been used equally by the soldier, the huntsman, the craftsman, or even by the ordinary householder" (17). Other features that were characteristic of the early civilizations of Egypt and Mesopotamia were absent, however: no palaces or royal graves had been discovered, for example, and no obvious temples. Despite these differences, Wheeler argued that the Indus people had adopted the *idea* of civilization from the Sumerians, along with key features such as writing.

Mortimer Wheeler‘s excavations on Indus sites between 1945 and 1948 radically changed the ways and means, which were being applied by the old school whereby stratification was ignored and ‘levels‘ were fixed by measurement from a datum. By this “incredible system”, in Wheeler‘s words: “the so-called stratification of the Indus Valley Civilization is dominated not by local observation, but at long range by the sea-level at Karachi. It is a survival of an obsolete device evolved in the alluvial plains of the great river-valleys of Egypt and Mesopotamia as a rough substitute for exact

observation in ill-controlled mass-excavations. It has no place whatsoever in the technique of modern fieldarchaeology."

Wheeler held the Indian high officials of the Archaeological Survey in even less esteem than Mackay did before him. He would not shy away to name names, calling some of them "dead wood'. Incidentally, these are the same gentlemen who one by one ended up becoming the Directors General of the Archaeological Survey of India after the Partition and these are the same big guns who later warmed the chairs at some of the institutes of higher learning in India. It is, therefore, not surprising that most of the archaeological work done in India after the Harappan Civilization - The Material Culture

Partition is of such a low quality and of such a limited confidence.

Post-Independence Discoveries: World War II came to an end in 1945 and along with it came the Independence of India and Pakistan in 1947. Independence brought with it many changes, one of which was the reorganization of the Archaeological Survey of India and a reinvigoration of archaeological research which has been dormant for sometime. The problems in Pakistan were: it did not have any organization to even organize the work that was in progress in this territory. An Archaeological Department was hastily set up, which then became the Department of Archaeology.

The subsequent years of this research were indeed heroic in both countries and a lot of good work was indeed done. The description of the discovery of the Indus Age would be incomplete without some recognition of these projects that have played an important role in forming our historic perceptions of the Harappan Civilization. This research is not so distant from us that it can be considered historical, yet it is very much part of the substance of this chapter. There are several accounts of these endeavors that deserve to be mentioned here, some of them dispassionate, some rather excessively self-cogratulatory, some intended to project certain personalities in the then-existing bureaucracy, and some showing a missionary zeal of a newly-found nationalism. We contend, therefore, to cite an excellent work of Possehl (18) which is both complete and impassionate, giving us a complete account of research work, both in India and Pakistan after 1947.

At partition, the archaeologists in the new Indian nation became isolated from the area of the Indus Civilization. Knowledgeable archaeologists with the Archaeological Survey of India on the eve of Independence would have been well aware that the wealth of Mature Harappan sites, both excavated and unexcavated, were in Pakistan, along with huge collections. Most important were the two great cities: Mohenjo-daro and Harappa. In fact, there were only two excavated Harappan sites in the new India: Kotla Niahang Khan and Kalibangan on the Indo-Pak border. Even here, in the case of Kalibangan, the cultural affiliation to Indus Civilization was not yet recognized. This led Indian archaeologists to begin an intensive period of exploration followed by excavation of key sites. The first of the key projects was undertaken by S.R. Rao, an archaeologist of sort at the Archaeological Survey of India, who began exploration in Gujarat where some Late Harappan and post-Harappan sites were already known. This led to the excavation of Lothal. Rao's work in Gujarat was carried forward by J.P. Joshi and Bisht and their explorations and excavations in Kutch, especially at Surkotada and Dholavira have yielded useful information about the eastward extension of the Indus Civilization. Kalibangan in northern Rajasthan, just across the IndoPakistan borders, was taken under excavation for nine consecutive seasons by B.B. Lal and B.K. Thapar, both of whom had participated in the Wheeler field schools. This was the first horizontal excavation of an Early Harappan settlement

and informed us of the nature of both the Early and Mature Harappan in the eastern part of the Indus Valley.

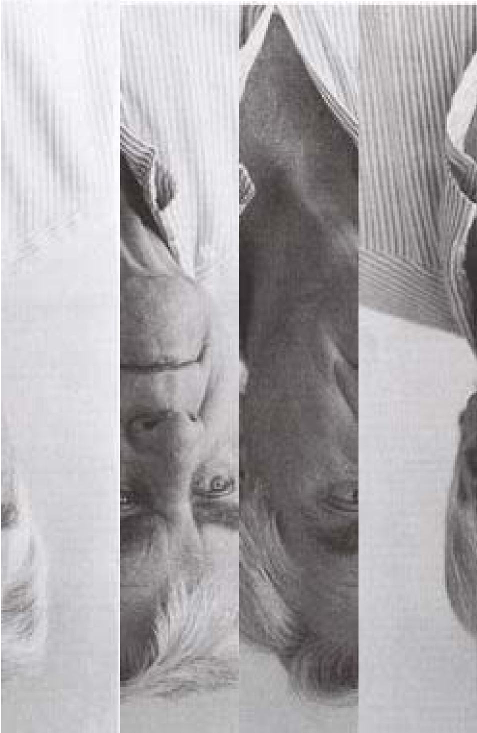
Then in 1950s, there was a spurt of activities and, based on the results of B.B. Lal and S.R. Rao, a whole cottage industry sprung up in Indian archaeological circles, the ultimate product of which is the discovery of hundreds of “Harappan” sites all across the Indian Punjab, Haryana, Rajasthan, even in Uttar Pradesh and Medhya Pradesh. Similarly, a host of “Harappan” sites were discovered in


Gregory L. Possehl - an eminent synthesizer of the Harappan Civilization

the length and breadth of Gujarat and beyond. The definition of “Harappan” site was ignored altogether: if they found even a sherd resembling the Indus, the site was immediately declared “Harappan”. There was no check on the accuracy of the field work, there was no peer reviews of the reports and no second opinion on the interpretations. The officials at the Survey, the State Governments, some academicians and even whole institutions got involved in this frenzy - as long as the ‘discoveries’ contributed to ‘nation building’ and ‘reclaiming the past’, everything seemed to be kosher. These efforts are still continuing in the garb of finding the roots of in “Indian Civilization” but at much less feverish pace.

As mentioned earlier, Sir Mortimer Wheeler was prevailed upon to function for a time as archaeological advisor to the newly established Government of Pakistan and was instrumental for founding the Archaeological Department of Pakistan. Without his sound guidance in those difficult and frustratingly formative years it is questionable whether a bona-fide Department of Archaeology of Vedic

finding Harappan
visualizing with
Indus port in
cities (of
community is *Puranas* again, the



Walter A. Fairservis, *The Roots of Indian Civilization*

could have been developed so quickly. From the very beginning, the Department followed a liberal policy in allowing its staff to freely collaborate with foreign missions, even allowing foreign archaeologists to work independently throughout Pakistan. As a result, Italian expeditions, under the general direction of G.Tosi, worked in northernmost region of Pakistan for several years. Their interests have



ranged from historical periods to the Stone Age.

Gregory L. Possehl

masquerade *Indus Ag-the Beginning* Japanese archaeologists worked at Harappan, J.M.

and *The Harappan Civili*Casal of the French Archaeological Mission com*zation*pleted excavations at the important pre-Harappan and Harappan period site of Amri. He also excavated in the Ornach Valley in southeastern Balu

‘facts’,

chistan. Archaeological reconnaissances have been make ‘new archaeological conducted by Beatrice deCardi of England, and by Henry Field of Peabody Museum. Walter Fairservis

into a
picture
of
“Mother
of the United States has done most of the basic India”. They are busy in
surveying and pottery analysis for the Early Indus

period of Quetta, Zhob, and Loralai areas. He also excavated the important Harappan site of Allahdino.

In 1947 the beginning of food production and settled life, the 'neolithic', was obscure. No one knew where, let alone when, the 'neolithic' developed in the subcontinent. Archaeologists knew that the Harappans in Sindh and the Punjab were wheat and barley farmers, who kept cattle, sheep and goats, but the roots of this

subsistence system had not been discovered. This began to change in 1952 with Walter Fairservis's excavations at Kili Ghul Mohammad (19), but the real progress took place between 1974 and 1985 with the French excavations at Mehrgarh, under the direction of JeanFrancois Jarrige.

The French excavations at Mehrgarh have given us our first in-depth insight into the beginnings of the village farming community and pastoral camp in the subcontinent. Through an interesting combination of chronological control and archaeological excavations Jean-Francois Jarrige and his team have pushed the beginnings of sedentism back to the seventh or even eighth millennium BC, giving us an important insight into the food producing foundations of the Indus Civilization.

The date of Mehrgarh can be estimated from radiocarbon dates. They range from 9385±120 BP to 5530±180 BP. Thus, the beginning of the food producing economy at the site can be placed with reasonable confidence within the seventh millennium. There are periods of abandonment in the excavated areas long enough for paleosols to have formed, indicating a long segment of time for this period. The later periods of the Mehrgarh sequence is also important because it traces the long history of a single settlement. There is work on these periods at other sites in Pakistan: Gumla, Kili Ghul Mohammad and Damb Saadat, Kot Diji, Jalilpur , Balakot, Rehman Dheri, Sheri Khan Tarakai, Islam Chowki and Lak Largai, Ghazi Shah, and Lewan. These excavations, and associated exploration, document the changing configurations of settlement prior to the Mature Harappan.

The excavations of Marshall and his colleagues at Harappa and Mohenjodaro in the 1920s and 1930s were mammoth undertakings, executed at a time when field archaeology was a relatively young discipline. It is small wonder that the excavations are found wanting by more recent standards and that they leave unanswered a host of questions that are now seen as important. Work was therefore undertaken at Mohenjodaro and Harappa aimed at reassessing the evidence from these early excavations, with seventy years of hindsight and all the most up-to-date equipment, technology, and techniques. At Mohenjo-daro Michael Jansen studied the original excavation photographs and records, making their own complete photographic and documentary record of remaining architecture, and investigating craft activity areas and other previously exposed remains.

The Jansen team worked closely for a time with another group of archaeologists from IsMao in Rome, under the direction of Maurizio Tosi. There was much good work done by these teams. Jansen organized archives, discovered field notes from the Marshall and Mackay field seasons, reprinted and

conserved photographs and was responsible for many other small triumphs that taken together are a significant contribution to understanding Mohenjo-daro. Jansen also made a salient contribution to the history of research on the Indus Civilization (20). Jansen developed his own body of theory on Mohenjo-daro. First, he believed that the site was a 'founder's settlement, built at the beginning of the Mature Harappan as a kind of symbolic representation of the new civilization. This city was built on a series of platforms which elevated the settlement above the plain, protecting it from floods. He notes that the basic alignment of streets, lanes, drains and wells were laid out at the beginning and maintained through the span of the Mature Harappan.

**Jean-Francois Jarrige**

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E*A!%(>*,(# &:# D%$)!*&"&B5# # $&0"-#)!7*# 2**,# -*7*"&A*-# '&# F0.$C"5<# H%&>#
()*# 7*%5#

Harappan Civilization - The Material Culture
2*B.,,.,B3# ()*# E*A!%(>*,(# :&""&@*-# !# ".2*%!"# A&".$5# .,# !""&@.,B# .('# '(!::# (&# :%**"5#
Much of the water management data are found in
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@&%C#
traditional potters and shell workers. From the work
Jansen's elegant work,
City of Wells and Drains
.,-*A*,-*,("5# ()%&0B)&0(# /!C.'(!,<# D'# !# %*'0"(3# +(!".!,# *IA*-.(.&,'3# 0,-*%# ()*# B*,*%!"#
of these teams we certainly gained a far clearer
(21).

-.%*$(.&,#&:#;<J&$.3#@&%C*-#.,#,&%
()*%,>&'(#%*B.&,#&:#/!C.'(!,#:&%#'*7*%!"#5*!%'<#J)*.%# understanding of the layout of this city and how it
.,(*%*'('#)!7*#%!,B*-#:%&>#).'(&%.$!"#A*%.&-'#(&#()*#=(&,*#DB*<#K!A!,*'*#!%$)!*&"&B.'('#
Many studies have spun off of the Aachen operated.

(Jansen's)
project
at
)!7*# 2**,# @&%C.,B# !(# 4!%!AA!,3# K<9<L!'!"# &:# ()*# H%*,$)# D%$)!*&"&B.$!"# 9.".&,#
)!'# Mohenjo-daro. Alexandra The accomplishments of this project have
Ardeleanu-Jansen has studied the sculpture, terra

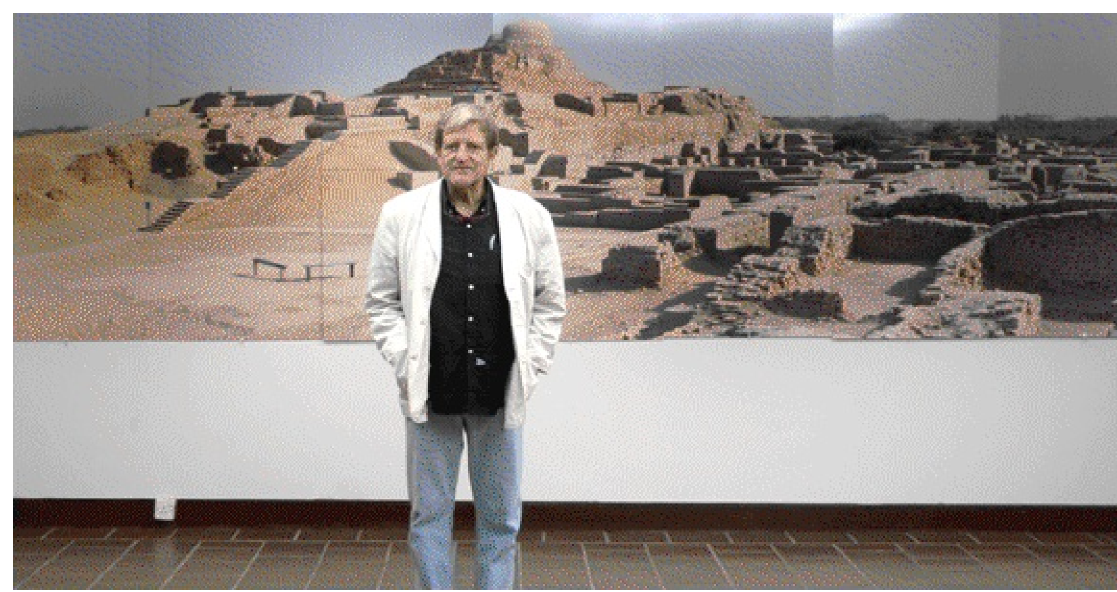
$&>A"*(*-#*I$!7!(.&,'#!(#()*#.>A&%(!,(#A%*G4!%!AA!,#!,-#4!%!AA!,#A*%.&-#'.(*#&:#D>%.<#
been many, including the training of a number of cottas and excavated a well. Ute Franke-Vogt stud4*# !'"&#
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glyptic material. Several studies of Mature
%*$&,,!."!,$*'#
)!7*#
2**,#
Pakistani students.
$&,-0$(*-# 25#
The research seems
Harappan craft production were conducted.
Based
-*L!%-.# &:# P,B"!,-3# !,-# 25# 4*,%5# H.*"-# &:# /*!2&-5#
to have been most
in large part on their research at Mohenjo-daro,
successful in 90'*0><#?!"(*%#H!.%'*%7.'#&:#()*#8,.(*-#=(!(*'#)!'#-&,*#
>&'(# &:# ()*# 2!'.$# '0%7*5.,B# !,-# A&((*%5# !,!"5'.'# :&%# ()*#defin
Blackman and Vidale have produced some gener ing the Early Harap
alizations
on
Indus
craft
production. The first P!%"5#+,-0'#A*%.&-#&:#Q0*((!3#R)&23#!,-#S&%!"!.#!%*!'<#4*#
!'"&#*I$!7!(*-#()*#.>A&%(!,(#4!%!AA!,#'.(*#&:#D""!)-.,&<##pan settlement at the
thought is that in some areas, like Cholistan, small southern end of the
settlements form a cloud of minor sites around an
J)*# *I$!7!(.&,'# &:# 9!%')!""# !,-#).'# $&""*!B0*'# !(#
large AB Mound, ex
urban center. Many of the smaller sites appear to
4!%!AA!#!,-#9&)*,1&-!%&#.,#()*#TUVW'#!,-#TUXW'#@*%*#
tending to Mound E .
have been specialized industrial localities (22). In They also>!>>&()# 0,-*%(!C.,B'3# *I*$0(*-# !(# !#
(.>*# @)*,# :.*"-#a
other regions a different pattern emerges. For ex
!%$)!*&"&B5#@!'#!#%*"!(.7*"5#5&0,B#-.'$.A".,*<#+(#.'#'>!""#
phase of occupation
ample,
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@&,-*%# ()!(# ()*# *I$!7!(.&,'# !%*# :&0,-# @!,(.,B# 25# >&%*#
Early
Mohenjo-daro,%*$*,(#'(!,-!%-'#!,-#()!(#()*5#"*!7*#0,!,'@*%*-#!#)&'(#&:#(Kot Di
Blackman and
F0*'(.&,'# ()!(# !%*# ,&@# '**,# !'# .>A&%(!,(<# ?&%C# @!'#

jian) occupation. This
Vidale
note that:
()*%*:&%*##0,-*%(!C*,#!(#9&)*,1&-!%&#!,-#4!%!AA!#!.>*-#
appears to be related
O*!(%.$*#
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Harappan



:)+2".5%;<%=$"5,>%!(#%*!"*".,B#()*#*7.-*,$*#:%&>#()*'*#*!%"5#*I$!7!(.&,'3#“The surface sur to the Hakra wares

vey of Mohenjo Cholistan, of@.()# '*7*,(5# 5*!%'# &:#).,-'.B)(# !,-# !""# ()*# >&'(# 0AG(&Gbut it
-!(*# *F0.A>*,(3# (*$),&"&B53# !,-# (*$),.F0*'<# D(# 9&)*,1&-!%&# !# 1&.,(# ;*%>!,G+
(!".!,Gdaro shows that has some unique fea
most of the heavy,
polluting indus
tures as well. The excavations Harappan levels have produced of the/!C.'(!,.#(*!>#"*-
##25#9.$)!*"#K!,'*,#'(0-.*-#()*#&%.B.,!"#*I$!7!(.&,#A)&(&B%!A)'#!,-#Mature an%*$&%-
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#&:#%*>!.,.,B#impressive



Michael Jansen

tries (e.g. ceramic
!%$).(*$(0%*3#!,-#.,7*'(.B!(.,B#$%!:(#!$(.7.(5#!%*!'#!,-#&()*%#A%*7.&0'"5#*IA&'*-#%*>!.,'<#
number of objects (seals, tokens, and others) with and brick firing the Harappan script on them. The
excavation team
and
metallurgical
D(# 4!%!AA!# ()*# D>*%.$!,#4D6/# Y4!%!AA!# D%$)!*&"&B.$!"# 6*'*!%$)# /%&1*$(Z3# .,.
(.!""5#

spent a good portion of time excavating the south
activities) are not
0,-*%#;*&%B*#E!"*'#!,-#'.,$*#).'#-*!()#25#).'#!2"*#'0$$*"&%'#K&,!()!,#9!%C#[*,&5*%#
eastern part of Mound E, and the gap between this
!,-# 6.$)!%-# 9*!-&@3# 0,-*%(&&C# '&>*# "*,B()5# *I$!7!(.&,'3# (*!'.,B# &0(# ,*@# represented in the

urban compound. Mound and ET. They have found a very wide mud

brick foundation and-*A%*-!(.&,'<# J)*5# *I(*,-*-# ()*.%# 0,-*%'(!,-.,B# &:# ()*# 4!%!AA!,# %*>!.,'# 25# It
must
be
pre
gateway in this corner
$&,-0$(.,B# >!,5# *IA*%.>*,('3# '0$)# !'# $&,'(%0$(.,B# !,-# :.%.,B# %*A".$!'# &:# +,-0'# C.",'3# sumed that these

activities were carried out in a series of peripheral settlements (now invisible due to alluviation) that

supplied the centre.” Blackman and Vidale go on to note that non-polluting industries were located within Mohenjo-daro. These industries were involved in the manufacture of things like seals, beads and shell ornaments, luxury and other prestige items, probably for consumption within the city. The very high quality of Indus craftsmanship is also highlighted by these studies.

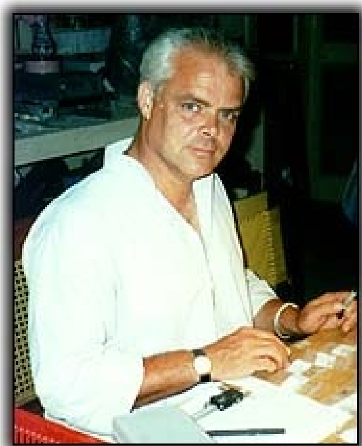
As new work took place at Mohenjo-daro, a renewed investigation of Harappa was also formulated. At Harappa the American HARP (Harappa Archaeological Research Project), initially under George Dales and since his death by his able successors Jonathan Mark Kenoyer and Richard Meadow, undertook some lengthy excavations, teasing out new information from the scanty ruins that survived the 19th century railway builders‘ depredations.They extended their understanding of the Harappan remains by conducting many experiments, such as constructing and firing replicas of Indus kilns, and by studying the abundant ethnographic evidence, such as the craft techniques of of the city (23).

In
the

!"#$%&'% early years of the project many resources were devoted to excavating the Mature Harappan cemetery, known as R-37. Ninety skeletons were recovered and a team of physical anthropologists has analyzed them. Their principal findings can be summarized as follows.
• Most of the specimens were females.

• The general health of this sample of the population of Mature Harappans was quite good.
• No cases of nutritional inadequacy, such as rickets, scurvy or anemia were identified: however there are three cases of ‘arrested growth lines ...' (24) .
This same report notes that there was a low
incidence of traumatic injury or chronic infectious
disease and no malignant neoplastic disease. Arthritis was the most common health problem identifIed in this skeletal series, most of it associated with

the spinal column. 'There are several cases of se


J.M. Kenoyer

vere arthritis in the neck, including fusion of adjacent elements. This could be associated with un**!** usual stress on the neck vertebrae, such as would

!"#$ %&$ '()#&*"+$ (,-$!%)"#!"($ -(,".+/!0,*1$ -2*#-"1-3$ ')1,$!'$ (,-$ 1/!4($ (-1,"*5)-'$ .4$occur with carrying heavy loads on the head' (24). (/!#*(*."!6$0.((-/'$!"#$',-66$7./8-/'9$:/.;$(,-$7./8$.4$(,-'-$(-!;'$7-$!/-$+!*"*"+$!$4!/$This is, of course, one of the most common cus16-!/-/$)"#-/'(!"#*"+$.4$(,-$6!&.)($.4$(,-'-$1*(*-'$!"#$,.7$(,-&$.0-/!(-#9$$$$

toms in South Asia today, especially among women, and this observation might indicate considerable <,-$;.'($ *;0./(!"($ -44-1($ .4$time depth for this practice. In the end this research

tells us that the population of people interred in(,-'-$

questions as Harappan origin, the life span and dates of the civilization, the social, economical and cultural nature of the civilization itself, religion, political structure of the society, and the causes of its decline and demise.

The goals of archaeologists have changed dramatically since the brick-robbing days of the *"(-/"!(*."!6$
nineteenth century and the earliest research in the
century. As discussed, the East India
chaeology itself. The spirit of
/-0./(*"+$ 7!'$ +-"-/!66&$;!*"(!*"-#9$ <,*'$ 7!'$ *"$ ',!/0$
Wheeler's teaching was kept alive,$the Department's archaeologists re
mained continually exposed to mod-"#-#$)0$!($,*+,$06!1-'$*"$(,-$?)/2-&$!"#$'(!/(-#$(.$7!/;$)0$
ern methods, their work was exten
(,-$ 1,!*/'$ .4$ *"46)-"1-$!($ (,-$ "-76&$ 1/-!(-#$ *"'(*()(-'$ .4$ sively peer-reviewed, and a high6-!"*"+'9$ @"#-/$ (,-*/$ 1.//)0(*"+$ *"46)-"1-3$ (,-$ "-7-/$standard of reporting was generally



M.R.Mughal

'-2-/!6$ *;0./(!"($

1.66!%./!(*."'$ 7!'$."$ (,-$ 5)!6*(&$ .4$ 7./8$ 7,*1,$ 7!'$twentieth ()*+,-$./%,0%12$%3456*%7)-)8)9"1),4!Cemetery R-37

were healthy agriculturists with bioCompany and the British government funded much logical affinities to later Pakistani populations. of the early research. During the colonial period,

The most important effect of these interna!"#$ %&$ '()#&*"+$ (,-$!%)"#!"($ -(,".+/!0,*1$ -2*#-"1-3$ ')1,$!'$ (,-$ 1/!4($ (-1,"*5)-'$ .4$

tional collaborations was on the quality of work territory and plotting the location of archaeological

/-;!*"-#$1."(*")!66&$-=0.'-#$(.$;.#-/"$;-(,.#'3$(,-*/$7./8$(/!#*(*."!6$0.((-/'$!"#$',-66$7./8-/'9$:/.;$(,-$7./8$.4$(,-'-$(-!;'$7-$!/-$+!*"*"+$!$4!/$

which was undertaken by the Department of Arsites. This included recording the architecture and 7!'$ -=(-"'*2-6&$ 0--/>/-2*-7-#3$!"#$!$,*+,$ '(!"#!/#$ .4$16-!/-/$)"#-/'(!"#*"+$.4$(,-$6!&.)($.4$(,-'-$1*(*-'$!"#$,.7$(,-&$.0-/!(-#9$$$$ city plans of its major sites and re

trieving;.'($antiquities. As a colonial

<,-$ .4$ (,-'-$power, the British government*;0./(!"($ -44-1($

1.66!%./!(*."'$ 7!'$."$ (,-$ 5)!6*(&$ .4$ 7./8$ 7,*1,$ 7!'$

sought to demonstrate the brilliance

of an early and forgotten civilization

that had once occupied territory that,

millennia later, they had conquered.

/-;!*"-#$1."(*")!66&$-=0.'-#$(.$;.#-/"$;-(,.#'3$(,-*/$7./8$

The research thus had a political

7!'$ -=(-"'*2-6&$ 0--/>/-2*-7-#3$!"#$!$,*+,$ '(!"#!/#$ .4$

dimension. It served to create an

/-0./(*"+$ 7!'$ +-"-/!66&$;!*"(!*"-#9$ <,*'$ 7!'$ *"$ ',!/0$

vast territory encompassed by Brit

ish India, thus justifying the existing

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political boundaries by looking to the
(,-$ 1,!*/'$ .4$ *"46)-"1-$!($ (,-$ "-76&$ 1/-!(-#$ *"'(*()(-'$ .4$
Today archaeologists are conducting
6-!"*"+'9$ @"#-/$ (,-*/$ 1.//)0(*"+$ *"46)-"1-3$ (,-$ "-7-/$
many new excavations and surveys

throughout South Asia. Some pro
jects build on longstanding questions
'1,.6!/',*0$*"$!/1,!-.6.+&9$but bring fresh perspectives and the
application of modern technologies
<,-$ A-0!/(;-"($,!'$to their study, while others raise new1."#)1(-#$ '-2-/!6$

:;<;:6#2"8% maintained. This was in sharp contrast to the situation in India where a

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lot of " dead wood" ended up at high
'1,.6!/',*0$*"$!/1,!-.6.+&9$
places in the Survey and started to
<,-$
warm up the chairs of influence at the

A-0!/(;-"($,!'$ 1."#)1(-#$
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*"#9$<,*'$newly created institutes of leanings. 7./8$/-#-4*"-#$(,-$"!()/-$.4$(,-$I!/6&$J"#)'$1)6()/-
'$!"#$#.1);-"(-#$(,-$/-6!(*."',*0$The Department of Archae

%-(7--"$ G.($ A*H*!"$!"-;%6!+-$!"#$ (,-$ K!()/-$ L!/!00!"$ M*2*6*N!(*."9$ A-0!/(;-"($ *'$ology also conducted several important excavations: for example, in

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and documented the relationship be!/1,!-.6.+*'($ .4$ *"(-/"!(*."!6$ /-0)(-3$ Q/.4-"./$ A!"*3$ tween Kot Dijian assemblage and the *!"#$%"&' ()*+$,&-"*9$ F".(,-/$ Q!8*'(!"*$
-=06./-#$(,-$!/-!$!/.)"#$(,-$R.;!6$!"#$P!"")$O!66-&'$%)($
Mature Harappan Civilization. De$questions. These discoveries greatly
partment is also credited with con
$
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alter our conception of the extent of
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ducting extensive surveys in the In
7./8$/-#-4*"-#$(,-$"!()/-$.4$(,-$I!/6&$J"#)'$1)6()/-'$!"#$#.1);-"(-#$(,-$/-6!(*."',*0$
urban development, while discover
/-6!(*."',*0$ .4$!"1*-"($ Q!8*'(!"$ 7*(,$ M-"(/!6$ F'*!9$ S4$ dus Valley and Baluchistan. This was %-(7--"$ G.($

A*H*!"$!"-;%6!+-$!"#$ (,-$ K!()/-$ L!/!00!"$ M*2*6*N!(*."9$ A-0!/(;-"($ *'$ 1.)/'-3$ (,-/-$ 7-/-$ '-2-/!6$ F;-/*1!"3$ P/*(*',3$ R-/;!"3$
a major step toward a program of tlements help us understand the rela overall planning for future archaeo
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tions between urban and rural comlogical
excavations.
M.R.Mughal‘s
<,*'$ 7!'$!$;!H./$'(-0$ (.7!/#$!$ 0/.+/!;$ .4$ .2-/!66$06!""*"+$ 4./$4)()/-$!/1,!-.6.+*1!6$ munities. Researchers now have a
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work in Bhawalpur was quite revolu7*(,$ (,-$ 6.1!6$ better understanding of the environ
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tionary which he published in his lib0)%6*',-#$ *"$,*'$ 6*%-/!66&$ *66)'(/!(-#$ /-0./($!"#$%"&' ()*+$,&-" erally illustrated report *Ancient Cho* tlement as well as changes that oc F"#$ 6!'($ %)($ ".($ (,-$ 6-!'(3$ (,-/-$!/-$ (,-$ (,/--$ -;*"-"($
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gists of international repute, Profes
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worked closely with Marshall on the earliest excavations, and who had previously conducted research at archaeological sites in Mesopotamia. Marshall and Mackay painted a peaceful picture of the Indus Civilization. Finding no evidence of conflict and warfare, and unable to locate temples or royal tombs, they concluded that the Indus Civilization had been ruled by "literati, priests, craftsmen and traders" (25). In contrast, Wheeler and Piggott, based on interpretations likely colored by their own World War II experiences and their training in classical archaeology, led them to stress "militaristic imperialism" (25). Their evidence came from site plans reminiscent of those found in Roman archaeology, including features they referred to as "citadels," "bastions," "defenses," and "gateways." They also identified copper and bronze objects as implements of war. There are other points of differences, ranging from the nature of state (or non-state) to climatic conditions. Possehl (12) discusses them in the following terms in the interest of history.

Marshall's Paradigm for the Indus Civilization: Marshall put forth his synthesis of the Harappan Civilization in the opening chapters of his monumental work, *Mohenjodaro and the Indus Civilization.* His first concern was for the physical environment, and he proposed that the climate was different during the Bronze Age in Pakistan. Marshall supported this with the following evidence: 1) Baked bricks were used as protection against heavier rainfall; 2) street drains were used to carry off the rainwater and would not be needed under today‘s dry conditions; 3) the lion, a dry-country animal, may be completely absent in the representations of animals. Finally, the great archaeological explorer Sir Aurel Stein found the remains of flourishing Bronze Age communities in Baluchistan, leading him to conclude that there was a substantially larger population in this region during those times. Stein attributed this in large part to a wetter climate. V.Godon Childe supported Stein‘s position

with this observation: “The lavish use of baked brick in prehistoric cities would seem a needless extravagance under modern rainless conditions”. The hypothesis that the climate in the Greater Indus Valley was remarkably wetter in the third millennium BC is no longer accepted. The view presented in this book (see Chapter 4) is that the climate of ancient Pakistan was not markedly different in the third millennium BC from the one we have today.

On the cultural side, Marshall saw a striking uniformity at Mohenjo-daro and Harappa. “Though these two cities are some 400 miles apart, their monuments and antiquities are to all intents and purposes identical”. Once again, Childe concurs, noting how the two sites were “astonishingly homogenous.The agreement is so complete that every remark in the subsequent description would apply equally to either site”.

Marshall went on to say that the Harappans were just as individual (interestingly, he used the term *national* in this context) as the other civilizations, shown by the character of the domestic architecture and such monuments as the Great Bath: The “remarkably naturalistic quality” of Indus art is another feature, as is the painted pottery. The use of cotton instead of flax and the quality of the writing system were also seen as unique, “national markers” for the Indus. But behind these and manifold other traits that are peculiar to the Indus Civilization, its national character is a tissue of ideas, inventions and discoveries which were common property of the then civilized world. These shared features included domestication of animals; cultivation of wheat, barley, and other grains; growing of fruits; building of houses; organization of society in cities; spinning and weaving of textiles and dyeing them various colors; the use of the potter‘s wheel and the decoration of wares; river navigation; the use of wheeled vehicles; the working of metals; writing; fashioning of ornaments from faience, ivory, bone, shell, and semiprecious stones.

The Indus Civilization was centered in Sindh and the Punjab, but Marshall did not think of the two metropolitan centers as “twin capitals”. There was already some evidence for an extension of the civilization into Kathiawar (western Gujarat), although there was sparse evidence available from

".... competent dullness ... a dead level of bourgeois mediocrity in almost every branch of the visual arts and crafts"

(Stuart Piggott, writing about the visual art and artifacts of the Indus cities, in 1950)

the east, since little work was done there. The script was much like other quasi-pictographic scripts of the era, but its similarity had misled those who wished to decipher it. Four attempts, each using another of the scripts as a model, had failed by 1932, and Marshall cautioned against the use of this methodology. He found no reason to connect the language of the Indus people with Sanskrit, or its culture with the Aryans. In fact, he argued forcefully, and correctly, that the Indus Civilization was earlier than the Vedic period and these cultures were the products of different peoples. Marshall, speaking on the Harappan language, said that so vast an area probably contained the native speakers of more than one language but that it was likely that these were within the Dravidian group.

Marshall‘s discussion of Indus religion was the longest and most complex of all his statements on these ancient peoples. Briefly, he found evidence for a great male god, a female deity, cults associated with sexual symbols, and the beginning of *Shakti* (female power). Childe, the preeminent interpreter of ancient civilizations, joined the Marshall paradigm .

There are three theoretical positions that come through in Marshall‘s essays on the origins of the Indus Civilization. First, the Harappan civilization was a member of a class of civilizations, most closely related to Sumer and the proto-Elamites. It was “natural” that parallel between these civilizations would be found because of geography and a close relationship. While it was not sufficiently close for the Harappan to be termed “Indo-Sumerian”, the connection was real and important. He even included a simple list of finds that indicated close contact between the Indus and the Tigris-Euphrates regions. There was continuity between these distant peoples, and he was justified in using historical and ethnographic observations to further his understanding of the Indus peoples. It also helped him to interpret the language and ethnic or biological diversity of the Indus population. Finally, Marshall was a scholar with a commitment to the epistemology of his field. We are not presented with a fait accompli in terms of his propositions concerning the Harappans, but rather a reasoned argument, backed by a sophisticated use of other people‘s works and insights. Even when he is wrong, as in the case for a wetter climate, or his note on religion, Marshall offered his reasons for believing as he does, and this is a trait of considerable scholarly merit – certainly not found in all discourse on this civilization, even today.

The Wheeler-Piggott Paradigm: The accidents of war brought Stuart Piggott to New Delhi and enabled him to start on a revision of Childe‘s basic work in the light of the accumulated new knowledge of the intervening decade. He did not join Wheeler in the Archaeological Survey of India, but he did study archaeology while in British India during World War II. He and Wheeler set about creating a new paradigm for the Harappan Civilization that differed substantially from the one that had been put forward by Marshall, Mackay, and Childe.

Wheeler was Marshall's fiercest critic. Ignoring the latter's view that the “culture represented at Harappa and Mohenjodaro must have had a long antecedent history on the soil of India”, as well as the many “pre- and post-urban phase” settlements that had been discovered, Wheeler proclaimed his own theory of diffusion. According to him, “In the third millennium BC, India received from Mesopotamia the already established idea of the city-life or civilization but transmuted that idea into a mode substantially new and congenial”: it was only when the indigenous 'nonAryan' people of northern South Asia (Pakistan) took a leap into 'civic life' by emulating their materially advanced western neighbours, that the ethos of a civilization appeared in the Indus Valley. Wheeler's theory of 'stimulus diffusion' had no substantive evidence, but it was based, ironically, on Marshall's contentions, substantiated through the presence of Harappan artifacts in Sumerian and Mesopotamian sites, that there was trade 'intercourse between the Indus Valley, Mesopotamia and Elam' during the third millennium BC.

This paradigm had begun at Harappa on Wheeler‘s first visit to the site, before he had even begun to excavate there. He saw in the AB Mound a citadel to defend the inhabitants of the city from attack. Based on what Wheeler knew of Mesopotamian civilization, “the times produced in India a social organization not altogether unlike those of the contemporary west”; and “in Sumer, the wealth and discipline of the city state were vested in the chief deity, i.e. in the priesthood or a priest-king. The civic focus was the exalted temple, center of an elaborate and carefully ordered secular administrating under divine sanction”. This led Wheeler to think of the Harappan Civilization in a similar way:

“It can no longer be doubted that, whatever the source of their authority - and a dominant religious element may fairly be assumed - the lords of Harappa administrated their city in a fashion not remote

from that of the priest-kings or governors of Sumer and Akkad. In other words, the social structure of Harappa conformed in principle with that of the other great riverine civilizations of the day”.

Piggott follows this line of thought, but is more subtle in his treatment of Sumerian matters. His version is found in his book *Prehistoric India:* “A state ruled by priest-kings, wielding autocratic and absolute power from two main seats of government, and with the main artery of communication between the capital cities provided by a great navigable river, seems, then, to be the reasonable deduction from the archaeological evidence of the civilization of Harappa”. Wheeler pursued this theme in a book meant for a wide audience. In this work he uses such phrases as the followings in order to characterize his understanding of the Harappan civilization: “All is orderly and regulated . . . dull, a trifle lacking in the stimulus of individuality”; the “absence of suppression of personality in its details from street to street”; and “this scene of regimentation”; and in another place he refers to the “astonishing sameness of the civilization . . . another quality of it is its isolation”.

Artifacts that might have been weapons, such as spearheads, daggers, arrowheads, and axes, were identified, but as Wheeler noted, “a majority may have been used equally by the soldier, the hunter, the craftsman, or even by ordinary householder”. Other familiar features of the early civilizations were absent, however - no palaces or royal graves had been discovered, for example, and thus it was already clear that the Indus Civilization was significantly different from Egypt and Sumer and was therefore not established by culturally superior colonists from either region. Wheeler nevertheless still argued that the Indus people had adopted the *idea* of civilization from the Sumerians, along with significant features such as the use of writing. How this would have worked in practice was difficult to grasp at the time he suggested it. In the decades that followed, changes in our understanding of the way that cultural groups interact and cultures evolve have made this suggestion untenable.

Wheeler also filled in a chronological 'gap' between the Indus Civilization and its cultures, by proposing that the 'invading Aryans' had massacred the population of Harappa and Mohenjodaro. By creating evidence for this bloody encounter through his narrative of the skeletal remains at Mohenjodaro, Wheeler challenged Marshall's view that the urban civilization of the Indus Valley had long faded by the time the so-called 'Aryans' entered the Indian subcontinent.

Both Marshall and Wheeler had established their understanding of the nature of the Indus Civilization through Mohenjo-daro and Harappa, the only two sites that, until the 1960s, had been excavated for long periods of time and were known to contain a rich range of artefacts. Where Marshall drafted a long list of what he perceived were the 'national characteristics' of the Indus Civilization, Wheeler concentrated on the 'abstract qualities', which to him were its 'sameness, isolation and centralization'. Marshall's list included the domestication of animals, cultivation of grains, canal irrigation, weaving and dying of textiles, river navigation, use of wheeled vehicle, working of metals, and fashioning of ornaments; the range reveals the breadth of his perspective on civilizations. Wheeler's on the other hand was a summation of its 'civic life'. Hence, his appraisal was based on cities whose contents he interpreted through his knowledge of the Roman 'military' towns in Wales and England which he had excavated in the 1920s and the 1930s.

Under Marshall's directorship of research on the Indus Civilization, long-distance trade had been assumed to be a precondition for the survival of the Indus urban economy. Working on this assumption, Ernest Mackay, who excavated Mohenjo-daro between 1927 and 1931, had inferred that the Harappans were peaceful 'burgher' traders. Dismissing Mackay's characterization as 'the

bourgeois complacency of the Indus Civilization', and Marshall's assessments of the importance of long distance trade, Wheeler proposed an isolated civilization based on a centralized, militaristic imperialism. By juxtaposing the different theories then in vogue of the ancient states of Mesopotamia, Egypt, Anatolia and Rome, he endowed the Indus cities with an “administration [that] was straitened by religious sanction; a civic discipline rigidly enforced by a king-god or his priesthood”. Emulating him, and drawing on the prevailing notions on Sumerian kingship, Stuart Piggott, conceived for his magnum opus, Prehistoric India (1950), a state 'ruled by priest kings, wielding absolute and autocratic power from two main seats of government'.

Some prominent features of the Marshall paradigm were carried forward in the WheelerPiggott interpretation. Analogy, not likeness, with Sumer and Egypt is a feature of both, and the same justification for its use is given: The three civilizations were all members of a large class of historical phenomena. A wetter climate was also postulated, and the sameness of remains was highlighted in both views. There is little difference between these interpretations in their treatment of Harappan craft production. Also, while Marshall speaks of a unique “national” character of the Indus Civilization, quite different from that of Sumer and other contemporary Bronze Age civilizations, Wheeler provides a geographic basis for the separation of the Indus Valley from the rest of India and independent cultural development of Pakistan with no reference to the Indian subcontinent.

In his *Five Thousand Years of Pakistan*, Wheeler develops a thesis that the geographical conditions dictated the separation of Indus culture from its surroundings in the East and that this line of geographical and cultural demarcation ran almost parallel to the current boundaries between modern Pakistan and the Indian Union. The title of this little book is a willful paradox but contains a fundamental truth. Pakistan is a new Islamic state but is, nevertheless, like its older neighbors, a product of historical processes of which Islam itself is only the most recent and emphatic. In reviewing those processes, the modern historian and archaeologist turns first to geography and geology. How far did nature anticipate and control the activities of man, which have culminated in the new dominion? The answer is not difficult. The natural boundaries are the Arabian Sea in the southwest, the Baluchistan and Himalayan mountains in the west and the north, and the Thar Desert in the southeast. Only towards the east, between the desert and the Himalayas, is there an open fertile tract, upwards of two hundred miles wide, where the great plains of northern India continue unbroken into the Punjab. There alone are boundaries indeterminate in a geographical sense, and there alone is man completely arbiter of his destiny. Otherwise, “Pakistan is marked out as an integral unit no less by nature than by man.”

Conclusion: The discovery of the Harappan civilization is symbolized by the discovery of Harappa and Mohenjo-daro. It is, however, more than that. It relates to the whole series of heroic efforts which were undertaken by some brave soul in the difficult terrain of Baluchistan, Bannu, Derajaats, Sindh, Cholistan, and the Punjab. The postPartition research by Archaeological Department of Pakistan in collaboration with many foreign missions greatly added to these discoveries and to a large extent completed the picture. During the same time, some important discoveries were made along the Indo-Pakistan borders in Indian Punjab, Haryana, northern Rajasthan, Kutch, and Saurashtra in India. Some of this work is seemingly of good quality but a lot of it fell prey to a strong and devastating frenzy of ultra-nationalistic agenda that overtook the Indian establishment since the 1950‘s. Thus, a golden opportunity to learn about the expansion of the Harappan Civilization towards the east was lost.

As we muse about the urban phase of the Indus Age, as we marvel the town planning and architecture

of Mohenjo-daro and Harappa, and as we admire with amazement the beautiful Harappan seals, we ought not forget those who made it all possible – Masson, Cunnigham, Sahni, Vats, Marshall, Wheeler, Piggott, Mackay, Dale, Frid Khan, Durrani, and more recently, Meadow, Kenoyer, Wright, Mughal, Dani, and all. The discovery of Harappa may or may not be a chance event but the exposition of the Harappan civilization has been a long arduous journey.

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Chapter 4.

The Land and the Environment

Land & Environment Chapter 2

The Land and the Environment

Since the prehistory of human broader issue of the origins of civilizations, their
The Indus Civilization covered an area just under a million survival and their demise.
square kilometers (although this area has now expanded to
race is largely an interaction
of man with his environment, it In the following pages we shall briefly out over two million square kilometers under the reckoning of
would be instructive to review
some Indian archaeologists, and still expanding eastward by line the geography of Pakistan and the part it played leaps and bounds). The principal regions are Punjab and
some of the salient features of in the formation and development of the Indus Civi
Sind, the mountainous eastern end of the Iranian plateau, i.e.
Pakistan’s geography and the lization as a whole. The importance and antiquity ofBaluchistan, and the north western mountain ranges of the to at cultural regions within this land, and their relation
NWFP and a little beyond into
environment in order
least speculate on the physinorthern Afghanistan. ship to the varying physical environment have also Kashmir is not included except a narrow sliver of land
cal circumstance under which
bordering Pothowar. The northern part of the Thar Desertbeen stressed. We shall attempt to outline the (included in the present-day India) was occupied by the
the inhabitants of the Greater available evidence regarding the nature of past cli
Indus peoples, as were some of the salt plains and marshes
Indus Valley affected the cul mates and environments in the major regions of
of Kutch in Gujarat (again, in the present-day India). All of

tural changes which eventu Pakistan, and the extent to which this may be used these areas naturally fall under the gambit of the Indus
ally culminated in the devel to reconstruct the ecology of ancient cities of the Valley, as the northern Thar and Indo-Gangetic Divide are a
opment of an expansive
part of the Ghaggar-Hakra plain of the Indus system as were Indus Valley and the peripheral regions. A brief tour the marshes of Kutch a part of the Indus Delta. Thus, the
Bronze Age civilization in the of the overall Indus region, which covers a vast area
Harappan Civilization is essentially defined by the Indus
third millennium BC. This is inclusive of the northeastern edge of Afghanistan, River and the flood plains that the Indus and its tributaries all of Pakistan, and parts of India (see map below), feed. the subject of the present chapter. provides a framework for the subsequent discussion The Indus basin is framed by the Aravalli mountain range and the Great Thar Desert in
What were the historical processes that
furthered the development of agriculture and pas
on the environment that ostensibly prevailed during the east, and the Sulaiman and Kirthar ranges in the northwest and the west,the Indus Age. respectively. It is further divided by the junction of the hills from the west and the desert
toralism in this land on a preferential basis, what

in the east into Lower (Sind) and Upper (Punjab) basins. The latter includes the sub
were the factors that allowed the Indus man to startmontane Indus region comprising the Peshawar valley, the Pothowar plateau, the Salt THE LAND Range, and the lower Punjab. The outlying mountainous regions are an integral part of

living at fixed locations some 10,000-12,000 years
the Indus Valley as they are the lifeblood of the plains. Baluchistan is technically a part
ago, what were the circumstances under which a
large number of village farming communities sprang
Geographical Setting: Geographically, the
of the vast Iranian Plateau but it is geographically connected more with the Indus Valley core area of the Indus Civilization is defined by thethan with any other part of the region. The Harappan boundaries are, thus, the Arabian

up all over the alluvial plains and highland territoSea in the South, the vast deserts of the Iranian plateau in the West, the Pamirs, theIndus Valley and its support structure, which, in ries, what led to the development of a common civiKorakoram and the Himalayas mountain ranges in the north, a long mountainous borderturn, mainly constitute the area within the current of Koh-e-Suleman in the west, and a formidable Thar Desert in the East. Incidentally,
lization from diverse regional cultures, or what fac political borders of Pakistan and some overspills

these are the same borders that make Pakistan a modern political unit.
tors contributed to its ultimate demise? The answer across the borders into India on one hand and into lies in its geography and environment.The boundaries of a cultural or political region, such as the Greater Indus Valley, are eastern Afghanistan on the other. The Indus basin products of various historical processes which shaped them, but geography, more thanwhich drains central Himalayas is framed by theanything else, seems to playGeography of the Greater Indus Valley has
a deciding role in

been adequately covered in the first and second
determining their borders. The Aravalli mountain range and the Great Thar Desert predominant influence of geography has
been felt on the Greater Indus Valley right
volumes volumes of this series (*The Stone Age* and from the Stone Age and it has been the prime instrument for defining the natural
A Prelude to Civilization, respectively) but in view of

its importance for the study of the urban Civilization

a few salient features need to be repeated here. A brief outline of the geography and environment is necessary for two other reasons. The first is directly related to the geographical position of Pakistan in relation to western and Central Asia on one hand and to the Indian subcontinent on the other. How far this region was geographically connected to its neighbors must have had strong bearing on the subject of this chapter. The second reason is the issue of the birth of civilization in this region and its diffusion across the borders. The development of agriculture and pastoralism is an important mile stone in the journey of man to civilization and its dependence on the favorably disposed geographi cal position and the prevailing environment. Geog raphy and environment is, therefore, a part of the
in the east, and the Sulaiman range in the west. It is divided by the junction of the hills from the west and the desert in the east into Lower (Sindh) and Upper (Punjab) basins. The latter includes the submontane Indus region comprising the Peshawar valley, the Pothwar plateau, the Salt Range, and the plains of Punjab. The outlying mountainous regions are an integral part of the Indus Valley as they drain in the Indus basin and are the lifeblood of the plains.

The Kirthar Mountains form a border between the frontiers of the province of Baluchistan and the western edge of the Indus alluvial plains. Baluchistan is technically a part of the vast Iranian Plateau but it is geographically and economically connected more with the Indus Valley than with any other part of the plateau. Natural boundaries of this region are, thus, the Arabian Sea in the South, vast deserts of Iranian plateau in the West, the Pamirs, the Karakoram and the Himalayas mountain ranges in the north, a long mountainous border in the west, and a formidable Thar Desert in the East. These are also, more or less, the boundaries of the Indus Civilization.

On the western side of the Kirthars, there are several landscape features of relevance. They include mountain chains and valleys that extend from northeastern Baluchistan and bend toward the southwest. These valleys provide natural corridors between the Indus plain, Baluchistan and regions farther west in Iran. The remainder of Baluchistan consists of extensive rocky deserts in the north and northwest and a coastal belt that borders the Arabian Sea. The Northwest Frontier Province (now named Pakhtunkhaw, the Pashtun cludes rugged mountainous zones such as the Gomal plain where the archaeological site of Rehman Dheri is located.
Country) inand valleys,

**A geological view of the Indian subcontinent**

Finally, the area that divides the plains of the Indus system and those of the Ganga-Jamuna (conveniently called the Indo-Gangetic Divide) forms the northeastern boundary of the Harappan realm. This boundary extends southward through the Thar Desert, of which Cholistan is a part. It is an extensive area that is approximately 805 kilometers long by 403 kilometers wide, with sparse vegetation. The Thar's western boundary encroaches upon the lower Indus plain in Pakistan and its northwest margin in Cholistan. Its eastern boundary extends to the Aravalli Mountains and to the Rann of Kutch on its south, where the fifth major Indus city is located.

The Indus Civilization covered an area just under a million square kilometers (although this area has now expanded to over two million square kilometers under the reckoning of some Indian archaeologists, and still expanding eastward by leaps and bounds). The principal regions are Punjab and Sindh, the mountainous eastern end of the Iranian plateau, i.e. Baluchistan, and the north western mountain ranges of the Pashtun country and a little beyond into northern Afghanistan. Kashmir is not included except a narrow sliver of land bordering Pothwar. The northern part of the Thar Desert (included in the present-day India) was occupied by the Indus peoples, as were some of the salt plains and marshes of Kutch in Gujarat (again, in the present-day India). All of these areas naturally fall under the gambit of the Indus Valley, as the northern Thar and Indo-Gangetic Divide are a part of the Ghaggar-Hakra plain of the Indus system as were the marshes of Kutch a part of the Indus Delta. Thus, the Harappan Civilization is essentially defined by the Indus River and the flood plains that the Indus and its tributaries feed.

The Indus river is the main character in the story of the Indus Civilization. It also includes several major tributaries that are part of the Indus River system. Moving from west to east, they are the Jhelum, Chenab, Ravi, Beas, and Sutlej. These five rivers meet at the Panjnad and today flow into a single channel of the Indus. To the east of the Indus system lies the ancient Ghaggar-Hakra. The Ghaggar in India still flows seasonally, but the Hakra in Pakistan is now only visible as a relict channel in the deserts of Cholistan. The plains between the Indus and the Ghaggar-Hakra were once the location of four of the five major cities of the Indus Civilization.

The boundaries of a cultural or political region, such as the Greater Indus Valley, are products of various historical processes which shaped them, but geography, more than anything else, seems to play a deciding role in determining their borders. The predominant influence of geography has been felt on the Greater Indus Valley right from the Stone Age and it has been the prime instrument for defining the natural boundaries of this country. In fact, geography has shaped its cultural landscape almost from the first appearance of man on the scene and it is not at all surprising that the subsequent political forces frequently also interplayed within these constraints. Still, geography may not be the sole determinant of cultural and political boundaries of a country and the term ‘boundaries” and

“borderlands” in archaeology and prehistory denotes something wider and more fluid.

In summary, for the purpose of this overview, we are dealing here with an area which is generally known by the name of the Greater Indus Valley. This area spans from the Ghaggar-Hakra river basin, the Indo-Gangetic Divide, and the lowland of Kutch in the east to the far end of Baluchistan and the entire stretch of the Sulaiman Mountains, with their numerous passes, in the west. Its northern boundaries are in Kashmir and its southern borders are defined by the Arabian Sea, starting from the coastal Kutch to the farthest end of the Makran coast. These boundaries more or less also describe the political boundaries of modern Pakistan.

The Greater Indus Valley: Let us begin in the north. At first sight, the formidable mountain ranges of the north give the Indus Valley an aspect of exclusiveness, which it does not in fact possess. For example, there are a number of feasible if arduous routes that go out of Kashmir and enter the Central Asian world of Turkestan and the western regions of China, the Xinxiang province. Some routes between Peshawar and Chitral lead to the Pamirs, the most famous of them going via Hunza and Gilgit. There were two major Central Asian trading marts beyond the Pamirs – Kashgar and Yarkand. There were routes to Central Asia from the direction of Leh in Ladakh as well, skirting the foot of the high peak of Muztagh Ata. However, none of these northern approaches have played any dominant role in the formation of the Harappan Civilization or materially affected the history of this land in any other way. Their importance lay rather in the reverse direction: they were among the chosen channels for the diffusion of Buddhism and certain aspects of Buddhist art from Pakistan to Central Asia and China during the early centuries A.D.

...... geography has shaped its cultural landscape almost from the first appearance of man on the scene and it is not at all surprising that the subsequent political forces frequently also interplayed

within these constraints

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At this point mention must be made of the fact that all these routes across the Karakoram, and at least the main ones which went to northern Afghanistan, were feeders of the famous Silk Route which went all the way from China to Rome in the early years A.D. Another fact which calls for attention is that the routes across the main Hindu Kush massif in central Afghanistan were closely linked with the routes moving into, or coming from, Indus Valley. It was along such routes that Buddhism spread to Central Asia and China, and there are many Buddhist statues and painted caves standing sentinels along these hill and desert paths. The famous Buddha images of Bamiyan in the Hindu Kush (some of them demolished by the Taliban Government of Afghanistan), the sensuous ivories of Bagram in the Kabul region, the caves of the Thousand Buddhas at Dun Huang at the edge of the Taklamakan desert - these are only some of the beauteous things marking the trail of merchants, monks and pilgrims along these routes, linking the Indus Valley to Turkmenia and the far reaches of Chinese Turkistan.

On the northwestern frontier of Pakistan the picture is very different from that in the north. Here the approaches to Pakistan, though not always easy, are still frequented. Their use in pre-history was even more important. These routes can be grouped in two series: a northern and a southern. The northern group links north Iran and the Oxus region with Kabul and then with the central reaches of the Indus. The southern group links central and southern Iran alternatively with Kandhar and then through Khojak Pass to northern Baluchistan which then connects it to the southerly regions of the Indus

through the Bolan Pass. Alternatively, the northern Baluchistan connects rather easily to Makran and the Indus delta. Large deserts and desolate areas intervene between Iran and Baluchistan. Thus, there is not, and there has not been in the past, any significant direct links between these two regions.

The northern group today converges on the Khyber Pass, which has been a major traffic axis since the establishment of Peshawar, the ancient *Purushpur*, as a metropolis about 100 A.D. No doubt, the Khyber Pass must have played an important part in the communication between Pakistan and Central Asia in facilitating the movements of men and beasts. In fact, there is some archaeological evidence for the migration of people from Central Asia to Pakistan even at the beginning of the present interglacial period some 15,000 years ago and probably earlier, during the Middle Paleolithic, some 40,000 years ago. There is plenty of literary evidence that supports the movement of man and his cattle through this route some 2,000 BC. Of course, most of the invaders also used Khyber Pass to enter Pakistan in later part of history.

An important earlier route belonging to the above mentioned northerly group followed a more northerly and devious line along the Kabul River to Charsadda, the ancient *Pushkalavati*. This route connected the upper Indus Valley with Bactria and the modern Mizar-e-Sharif across the Hindu Kush passes. This route also played an important role in shaping the pre-history of Pakistan as well as that of Central Asia. South of the Khyber, alternative tracks used and still use the Kurram valley and the Peiwar Pass.

Still further south, the Tochi, Gumal and other valleys carry ancient thoroughfares from the direction of Ghazni and Kandhar uplands to the Derajaats and the Zhob valley. At this point, feeders from the southern group spread delta-like towards the Indus plain. The Zhob valley carries or carried a modest traffic north to northeastwards from the direction of Quetta, itself the northernmost of the three focal points of the southern group; others being Kalat and Las Bela. Southeastwards of Quetta a route enters the Indus plain via Sibbi. Westward from Quetta a camel route leads towards Kirman and southern and western Iran. At the southern end Las Bela, now an insignificant Baluch town, must have stood full in the tide of human immigration into Pakistan for centuries in the past.

The western mountain range look on the map like a formidable wall between Central Asia and Pakistan indeed. However, it never acted as complete barrier to human movements. In fact, it has often acted as cultural saddle supporting the same type of culture on both its slopes. On a different level, however, the mountains have defined the lines of human movements. So did the deserts in the west as well as in the east. The Sulemans are like foothills to the Hindu Kush to the north and the Karakoram farther to the northeast. As stated before, these mountains are barriers between Central Asia and the Indus Valley. It is in the valleys of these mountain ranges where the people of Chitral, Hunza, and Laddakh live. Kashmir is also a part of this topography.

Looking to the South, there is a long coastal urban revolution in the heart of the Indus Valley, these contacts grew and the urban culture of the Indus Valley was infused into these areas through the coastal traffic in the Arabian Sea. Several urban settlements, thus, arose there which continued to exist even after the Indus Civilization in the core area itself had decayed and demised.

The early settlers of Makran probably did not know the art of sailing but there is evidence that they did learn the use of boats quite early on. During this period, the Indus people did not have any contact with the outside world through the sea routes but within a short time, by 3000 BC, they

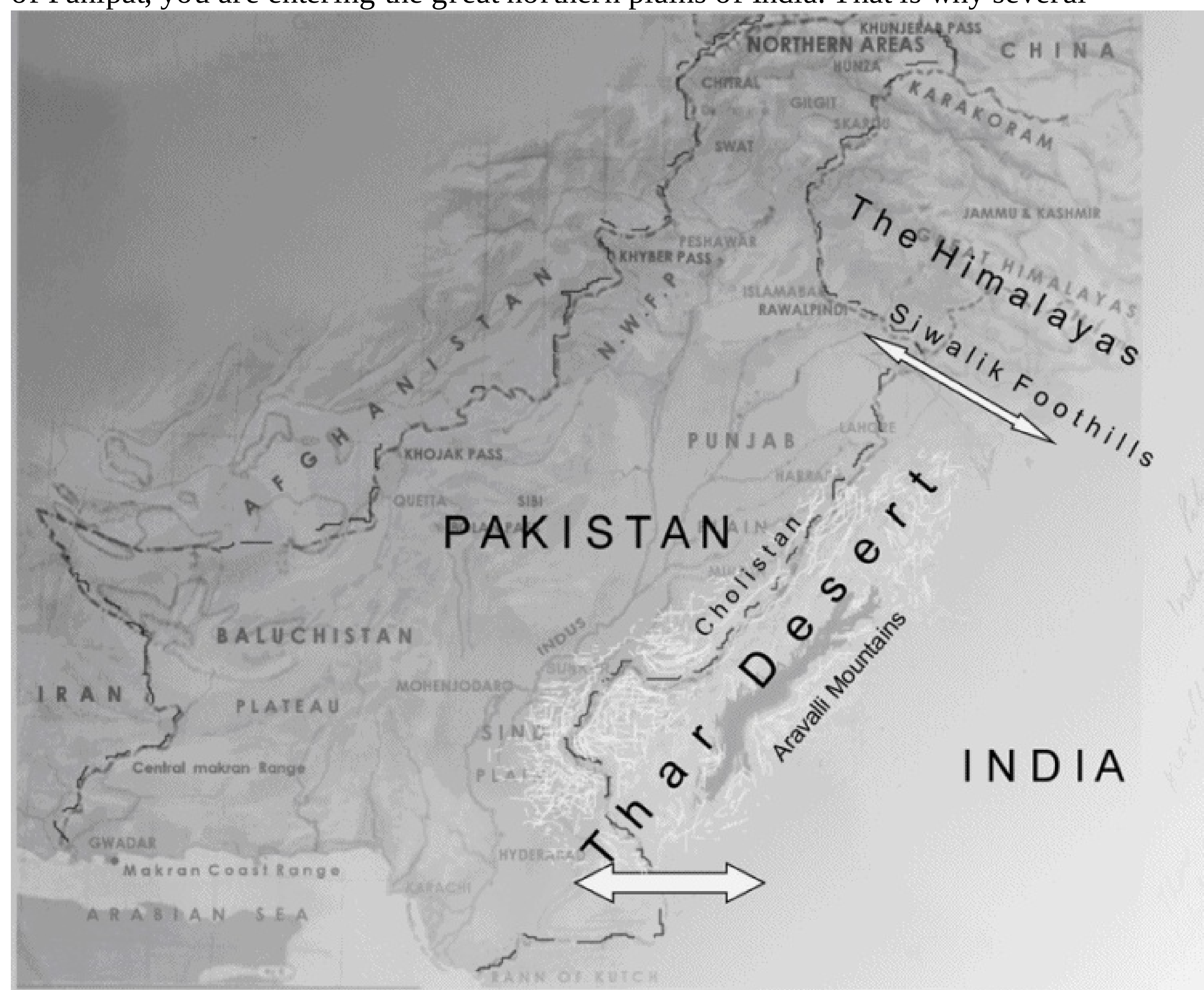
strip at the Arabian Sea, locating several seaports started to sail the Arabian Sea and were in close such as Gawadar in the west and Karachi/Port Qa
It is through this corridor that all prehistoric immigrations from Pakistan to India took contact with the people living around the Persian
sim in the east. Jewni, Ormara, Sumiani, Dhab, and
place. It is this corridor through which almost all the invaders from Central Asia or Iran Gulf, most notably in the present-day Oman, Ku
several
other
minor
ports
serve
fishing
villages
crossed into northern India. It was the area around this narrow corridor where the first wait, Bahrain, United Emirate and as far as Sumer
along the coastline. A look at the map suggests
petty kingdoms of the Aryans and the Aryanized Indus people appeared during the post
and Akkad of Mesopotamia. As stated earlier, these
Harappan period, and it is this general area where the great epic of *Mahabharta* was
Pakistan's central role in any traffic in the Arabian
contacts were important in the development of In
most likely composed. The plain of Panipat is the narrowest point of this corridor, even Sea, linking the Indus valley with the Gulf. The dus Civilization in the 3rd millennium BC. The set

coastal regions in the west enjoyed traditional mercantile intimacy with the east coast of Africa, albeit indi rectly, from where the Indus man probably learnt the cultivation of African millets (*bajra* and *jawar*) during the hey days of the Indus Civilization or somewhat earlier. These proved to be important crops for the summer months, made double-cropping agriculture possible, and helped to produce the 'surplus' that was an essential element for sustaining the process of urbanization in the 3rd millen nium BC.

By 3000 BC, the Indus people had started to sail the Ara bian Sea and were in close contact with the people living around the Persian Gulf, most notably in the

present-day Oman, Kuwait, Bahrain, United Emirate, coastal villages of Iran, and southern cities of Iraq. The archaeological and textural evidence, to be discussed elsewhere in detail in this book, proves beyond any doubt that the people of the Indus Civilization had intimate trade relationships with all these peoples up to the southern

today barely a stretch of 60 miles from north to south. Once you have crossed the plain of Panipat, you are entering the great northern plains of India. That is why several



important battles for the control of northern India have been fought at Panipat in the medieval history of the region.

The Thar Desert, geographically separates Pakistan from India; two narrow corridors, shown here by arrows, were, however, available between the two cultural regions.

This northern communication route, although becoming tremendously important in post

-Harappan history, played only a marginal role during or prior to the rise of the Indus Civilization, its maturation, or its decay and demise. It appears that the Indus man

part of modern Iraq. Textural evidence tells us that
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remained close to his own “homeland”, that is, the Greater Indus Valley, and, as a there was even a colony of the Indus artisans in Ur
moted short-range cultural exchanges between the
result, the Harappan Civilization did not overflow into the Gangetic plains. The banks of at the far end of the Persian Gulf. These contacts
the river Sutlej, an important tributary
fishing camps along the coastline and these interof the Indus, remained the easternmost
must have been important, directly or indirectly, in
coastal contacts might have helped them to intrude

boundaries of the Indus Civilization. It is only during the late post-Harappan times, the development of the Indus Civilization; they were even more important for sustaining the urban culture during 2,600 – 1900 BC.

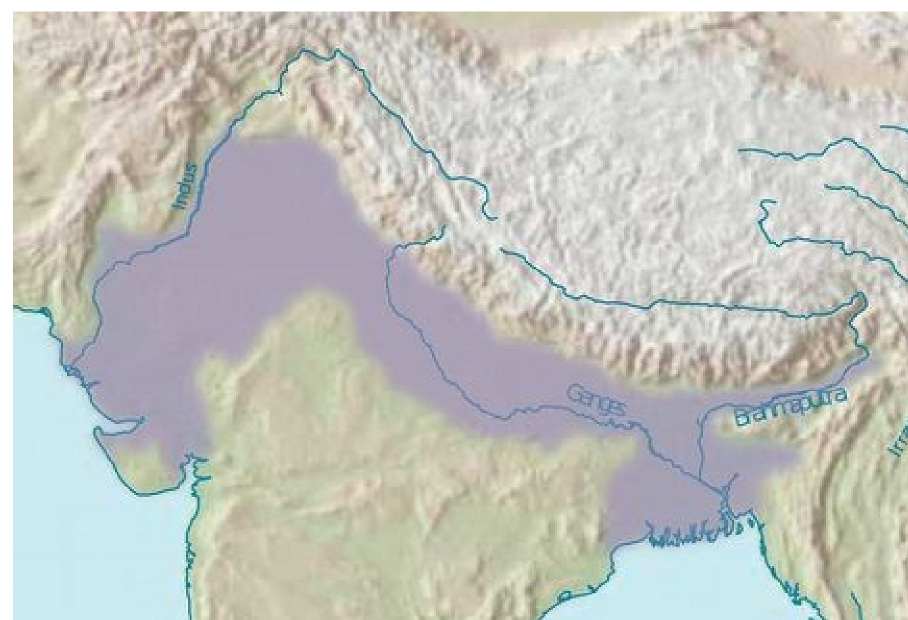
The agricultural and pastoral communities of the Early Indus period (3500 - 2600 BC) had already started to colonize the neighboring Kutch and coastal Gujarat in the southeast. During the into coastal Gujarat during the fourth millennium

BC.

South of the Himalayas in the present-day India lie the Great Gangetic plains, with an average width from north to south of some 200 miles and an average height of 500 feet above the sea. The prehistory and much of the history of the two plains, that is, the greater Indus plains on one hand and the Ganga-Yamuna plains on the other, in spite of their apparent continuity, is strikingly different. The reasons are geographic. Without going into details here, it should be pointed out that the land of the middle and lower Indus is barred from the plains of the Ganges as well as the peninsular India by a vast desert, the Thar, of which Cholistan desert in Pakistan is a part. At the eastern end of the Thar most likely composed. The plain of Panipat is the narrowest point of this corridor, even today barely a stretch of 60 miles from north to south. Once you have crossed the plain of Panipat, you are entering the great northern plains of India. That is why several important battles for the control of northern India have been fought at Panipat in the medieval history of the region.

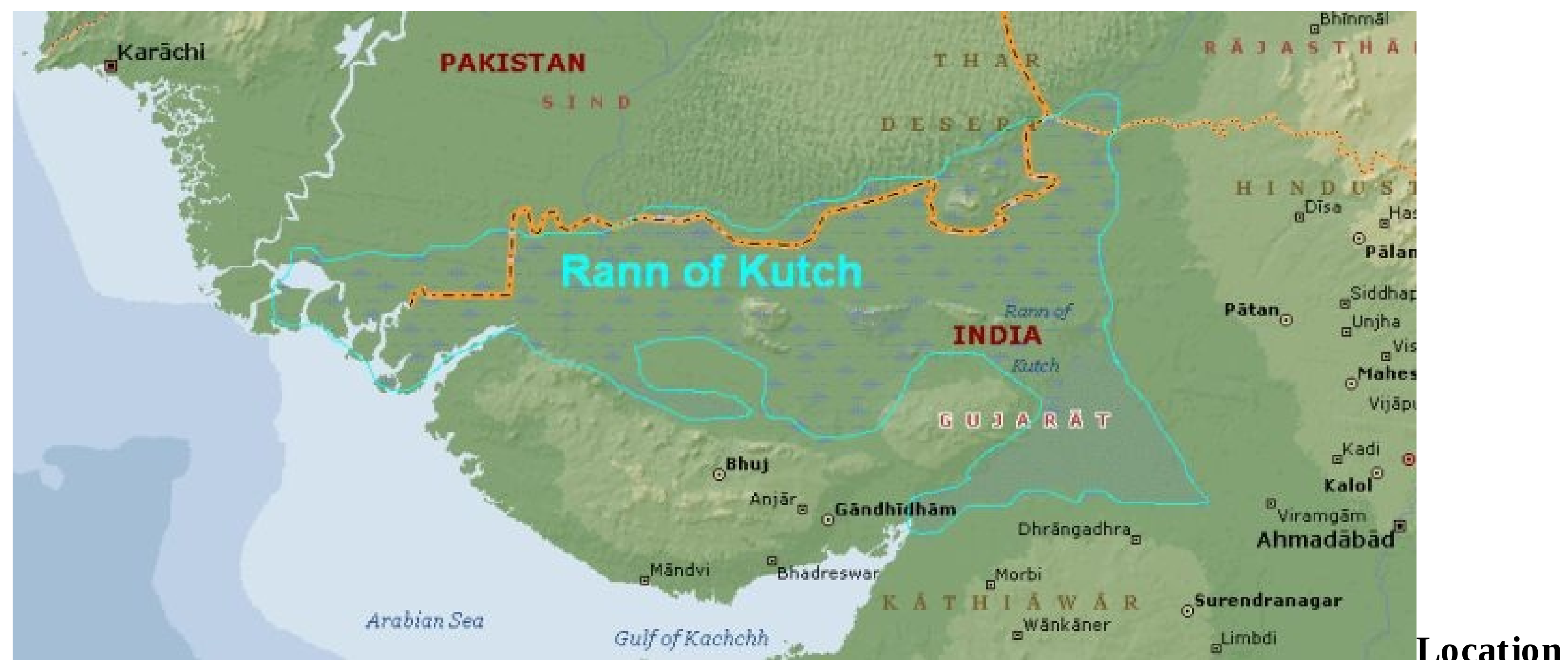
This northern communication route, although becoming tremendously important in postHarappan history, played only a marginal role during or prior to the rise of the Indus Civilization, its maturation, or its decay and demise. It appears that the Indus man remained close to his own “homeland”, that is, the Greater Indus Valley, and, as a result, the Harappan Civilization did not overflow into the Gangetic plains. The banks of the river Sutlej, an important tributary of the Indus, remained the easternmost boundaries of the Indus Civilization. It is only during the post-Harappan times, almost a thousand years after the decay and demise of the Harappan Civilization, that the communication between the Indus and the Gangetic plains became possible, when some of the Aryan tribes and the

Indo-Gangetic Divide



Desert is the mountain range of Aravalli which runs northeast to southwest and separates the Thar from Central India as well as from the Peninsula. These two hurdles in communication, i.e. the Thar and the Aravalli, form a fuzzy line of geographic hindrance that runs from the west of Delhi in the north, i.e. the IndoGangetic Divide, to Kathiawar in the South and separates Pakistan from the continental India. It is therefore not surprising that the eastern boundaries of the Indus Civilization were along this line. What is surprising, however, is the fact that the political boundaries of modern Pakistan also run more or less along the same separation line. Thus, it seems as though Nature itself ordained the eastern boundaries of Pakistan as much as it did those in the west and the north.

In spite of the above mentioned geographical impediments between Pakistan and the continental India, there is a narrow corridor between the Siwalik hills of the Himalayas and the northern end of the Great Desert where India and Pakistan geographically meet. It is through this corridor that all prehistoric migrations from Pakistan to India took place. It is also this corridor through which almost all the invaders from Central Asia or Iran crossed into northern India. It was the area around this narrow corridor where the first petty kingdoms of the Aryans and the Aryanized Indus people appeared during the post-Harappan period, and it is this general area where the great epic of *Mahabharta* was



Location of Kutch in relation to the Indus plains

Aryanized Indus peoples were able to clear the afore-mentioned corridor along the Siwaliks with the help of the increasingly available iron tools. Thus, the study of the Indus Civilization entails the study of the Greater Indus Valley alone with only peripheral interest in the borderlands to its west and a similar interest in the borderlands to its east.

There is another corridor, which connects the Indus Valley to the rest of the subcontinent. This is at the southern edge of the Thar Desert, between the sandy dunes of the Thar and the salty marshes of the Indus delta along the Arabian Sea. Here, again, the contact between the two regions was minimal but still significant. Most importantly, it was through this corridor that the Indus people colonized some coastal and western regions of Kutch and Saurashtra as early as the fourth millennium BC.

There are, however, no indications of a twoway cultural interaction between Sindh and Gujarat during this process of expansion: it seems that the colonized area was largely unpopulated at the time. This area boasts some isolated Early Indus settlements, a few Mature Harappan sites, and a larger number of post-Harappan remains. Geographically, here too the Indus man did not venture very far from his home, i.e. the Indus Valley; and the eastern end of the Indus delta remained his easternmost boundaries.



Sandy desert of Cholistan - the land between the Indus plains and the Ghaggar-Hara basin. Cholistan is an extension of the Great Indian Desert, the Thar.

It is obvious from the above that the existence of a formidable desert barrier between Pakistan and India has been a serious hindrance to Baluchistan.

The Hakra river basin is a special geographical feature at the eastern borders of the Indus Valley and is of utmost importance in connection with the rise and fall of the Indus Civilization. The Ghaggar-Hakra river system, actually a collection of several seasonal rivulets, once flowed from the northeast to the southwest and drained the Siwalik hills. This braid of seasonal water streams is now dry and was probably drying up during the Mature Harappan period. Some rivulets of this drainage system come to life in the monsoon season even today. Under several different names, they flow some distance in the present-day India and one or two streams even enter Pakistan, flow some distance through Pakistan and dry up below Bhawalpur Division. The main stream is known as Ghaggar in India and Hakra in Pakistan, thus the GhaggarHakra River.

Most of the modern Indian archaeologists have started to refer to Ghaggar-Hakra river as "Sarasvati", which is a mythical river praised and worshipped in the RgVeda and frequently referred to in later Vedic literature. This arbitrary name change is basically driven by an ultra-nationalistic and Hindutva agenda which is presently a rage in the academic and political circles of India, sponsored and encouraged by a significant portion of the establishment. Some fashionable western scholars have also started to use this name but those who see the political agenda behind it, still do not. There are, of course, some other Indian scholars, such as Shereen Ratnagar, Romila Thapar, Kochar, R.S.

communication between the two peoples during the prehistoric times. It is also clear that while there were and still are several convenient routes between Afghanistan and along the entire western there were only two between the Indus Valley and the area to its east. This explains one of the primary reasons that the two societies developed independently of each other in prehistoric as well as in historic times. This also explains the diffusion of ancient technology and culture between the two regions at exceedingly slow pace. For example, there are at least three millennia intervening between the two regions for the development of agriculture and at least two millennia for the emergence of city life. On the other hand, as will be seen in subsequent pages, the easy access from the west and the northwest interconnected the Indus valley and the west in such an intricate fashion that Pakistan became virtually an extension of the western and Central Asian culture, or vice versa, right from the advent of settled life in Pakistan borders,



Iranian Plateau is extremely important in the ancient history of Pakistan

Sharma, R.C. Thapar, and Irfan Habib, who have avoided the use of this name because it is neither grounded in actual history nor known in the present times. More importantly, it creates an erroneous connection of Ghaggar-Hakra with the RgVedic river Sarasvati. The search for the ’lost’ Sarasvati is, however, so intense and the volume of publications so large that it has become an almost impossibility to continue calling this dry river braid Ghaggar or Hakra without being accused of being biased.

The land between the Ghaggar-Hakra and the Indus is now arid. It is unproductive because of the non-availability of water. However, during the Indus Civilization or the time prior to it, this area could have been quite fertile. The Indus people established a large number of agricultural settlements along the afore-mentioned Siwalik drainage system all the way from upper Haryana to upper Sindh. Culturally and geographically, these settlements were indeed the extension of the Indus Civilization centered in the Punjab and Sindh and an urban center, Ganweriwala, did develop on the strength of

this array of agricultural and industrial settlements. This metropolis, discovered by M.R.Mughal, is reported to be larger in the settlement area than Harappa itself but is yet to be excavated.

Coming to the west again, the Iranian plateau played a significant part in the ancient history of Pakistan, especially in the domestication of animals and plants, development of agriculture, establishment of permanent villages, and the evolving of the Indus Civilization. It is a block of land that intervenes between the Fertile Crescent countries of the Tigris-Euphrates and the plains of the Indus. The plateau is essentially a vast basin with broad mountain chains thrust up at its rim, isolating the interior from the surrounding regions such as Central Asia and the great river valleys of the Indus in the east and the Tigris-Euphrates in the west. The interior of the plateau is made up of sub-basins and deserts with interior drainage. Only on the northeast, where the hills are lower and phase down into the spacious plains and deserts of Central Asia, is the plateau rim less well defined by geography. It has been shown in Volume II (*A Prelude to Civilization)* that the plateau's rim constituted the area where man first domesticated plants and animals, starting an agricultural revolution in the ancient world. Baluchistan is the eastern rim of the plateau and it actively took part in this important phase of human history. One Bronze Age civilization, i.e. Mesopotamia, arose on the western fringes of this plateau and one, i.e. the Indus Civilization, arose on its eastern end.

The Iranian Plateau is important in the ancient history of Pakistan in another way. To the west of Baluchistan lies a series of deserts, some dotted with oases. The presence of these barren lands on both sides of the Pak-Iranian borders constituted a severe hindrance for the migration of people into the Indus Valley or to the traffic in the reverse direction. Direct cross-fertilization of ancient cultures of these two areas, thus, did not happen with any vigor and intensity. Apart from some nomadic contacts between Baluchistan and Siestan, most of the interaction between Iran and Pakistan took place via southeastern Afghanistan.

Southern tip of Sindh is equally interesting. Here is the narrow strip of land between sea and mountain, which is the southernmost gateway to Pakistan; a gateway that witnessed the passage of Alexander westward to Persia after what was probably the most ambitious military adventure in history. Here Mohammad Bin Qasim led the Arab and Persian armies in the eighth century on to the conquest of *Al-Sind.* Northward, the SulaimanKirthar Hills mark the easternmost extent of the plateau of Iran. The hills run parallel to the course of the Indus. They fringe the white plain of Kachi, where the mean annual temperature is the highest in the world. Kachhi is at the foot of the Bolan Pass, which splits the Sulaimans at the heart of the chain. At the northern head of the Bolan Pass is Quetta. Northward, the Sulaimans form the homeland of the Pashtuns. The northern passes of the Gomel, the Tochi, and the Khyber are in Pashtun country. As much as the Indus Valley was isolated from the continental India, it was connected with Afghanistan, northern Iran, and Central Asia through these passes across an almost interminable mountain range, starting from Quetta/Pishin Valley in Baluchistan and spreading all the way to Chitral in the utmost north.

Western passes have never been an impediment to the traffic of men and animal between the Indus Valley and the region which we collectively call Central Asia. It will be shown that, in spite of being a self-standing geographical entity, the greater Indus valley always has had an intimate relationship, both economical and cultural, with this region. This emphasis on the western borderlands as the source of population, new ideas, raw materials, and objects makes all the more important an awareness of the cultural sequences in such areas as Afghanistan, Iran, and Turkmenia. By the same token, we do not see any importance of the areas east of the borders except in a very few situations

where these borderlands were considered as a source of some particular raw materials. The import of copper ore from Rajasthan is often quoted as an example but it is not certain if the copper of the Indus Civilization came from Rajasthan or from Chaghai hills and Lasbela in Baluchistan. Nevertheless, the aforementioned two openings between the Greater Indus Valley and the continental India were important for the diffusion of ideas, art, and objects from the west to the east by the third millennium BC and in the reverse direction in later times. These openings, especially the northern one, also served as conduit for the migration of people and animals in historic times, mainly from west to east. In this sense, ancient Pakistan served as conduit, between Central Asia and northern India.
We have seen that the Greater Indus Valley is a diverse region in terms of physical geography, ranging from high mountain ranges, to elevated plateaus, slopes of the hills, alluvial plains, arid regions, and coastal lands. These geographical features have exerted their peculiar influences on the ways and means of man's adaptation to his environment, determined his culture and set forth particular historical course for social and political developments. Thus, the cultural and historical geography of the Indus Valley ran almost in parallel with physical geography of the land.

It will be shown during the course of this narrative that as the geography was diverse, so were the cultural developments diverse throughout the land. The ensuing regional cultures definitely *Archaeology*
The Sindhi Domain or the Central Region:

Fifty Years of Harappan
varied in details but surprisingly a common thread
seemed to run through all of them and that this The 'eclipse' of the ancient cities of the Indus is still not thoroughly
is no satisfactory thread ultimately bound them together into a cul

35 The Central Region is an area of primary importance to the history of the Harappan Civilization. It is understood. There in this region that we detect early signs of urbaniza

explanation of the abandonment of Mohenjo Daro and many other
ture, which we have come to know by the name of tion of the Indus valley. It consists of the lower settlements in Sindh and for the near abandonment of Harappa. An up-to-date review of
the Indus or the Harappan Civilization. It will be reaches of the Indus, below the Panjnud. Although
the evidence is available (Possehl 1997). Wheeler's hypothesis that Aryan invaders brought
shown also that this common underlying base was
the Indus Civilization to its knees is no longer thought to be tenable
quite different in quantitative as well as in qualitative
Mohenjo Daro was abandoned by 1900 Be and there is no evidence
terms from that of the rest of the subcontinent. It is,
not exactly, it roughly constitutes the present-day (1947: 78-85). First, province of Sindh. The southern boundary of the for Aryans in the Central Region is the Arabian Sea and the Ranns of
subcontinent at that time. Second, the locale for the Rigveda is the Punjab. There is no Kutch, wherever they may have been located in evidence for a battle, arose in the Bronze Age in this geographical area or battles therefore, no wonder that the urban civilization that
at Mature Harappan sites in this region. The skeletons antiquity. This boundary extends to as far as Bala found in the late levels of Mohenjo Daro have no signs of trauma (Kennedy 1984), and
had no parallel in the borderlands to its east. kot, but not into the Welpat area of Las Bela, which Sindh is a distant echo in the *Rigveda*, so there is a bad historical

Geographic and Cultural Domains: The mismatch there (Dales is Gedrosia and Kulli country. The western bound1964). geographic area of the Indus Civilization is quite ary skirts the uplands of southern Sindh and goes The RaikeslDales hypothesis that a dam flooded out Mohenjo Daro does not seem toup the Baran Nai to Lake Manchar. From there it hold much water (Raikes

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H.T . Lambrickslopes of the hills, alluvial plains, arid regions, andthat the unconsolidated sedimentsthe Bolan Pass. The boundary crosses the united Indus Valley wouldcoastal lands. These geographical features haveto hold back the riverIndus and moves south skirting the edge of the (Wasson 1984) .exerted their peculiar influences on the ways and deep Thar Desert. It extends down to the Ranns of

Kutch and uses the northern edge of the Great Rann, wherever it too may have been ..... in antiquity, as the final leg of its eastern border.

means of man's adaptation to his environment, determined his culture and set forth particular historical course for each respective geographical region. Consequently, the cultural geography of this civilization ran almost in parallel with the physical geography. of the land.

In order to study the variously differentiated cultural traits of the early settlers of the Greater Indus Valley and to follow their convergence into the urban civilization Possehl has divided the area into several cultural and geographic regions or domains (1). We shall follow this scheme in reviewing the physical, cultural, and historical geography of the country. The map below roughly illustrates the regions of our interest.

Iran
Arabian Sea

The 'eclipse' of the ancient cities of the Indus is still not thoroughly understood. There is no satisfactory explanation of the abandonment of Mohenjo Daro and many other settlements in Sindh and for the near abandonment of Harappa. An up-to-date review of the evidence is available (Possehl 1997). Wheeler's hypothesis that Aryan invaders brought the Indus Civilization to its knees is no longer thought to be tenable (1947: 78-85). First, Mohenjo Daro was abandoned by 1900 BC and there is no evidence for Aryans in the subcontinent at that time. Second, the locale for the Rigveda is the Punjab. There is no evidence for a battle, or battles at Mature Harappan sites in this region. The skeletons found in the late levels of Mohenjo Daro have no signs of trauma (Kennedy 1984), and Sindh is a distant echo in the *Rigveda*, so there is a bad historical mismatch there (Dales 1964).

The Raikes/Dales hypothesis that a dam flooded out Mohenjo Daro does not seem to hold much water (Raikes 1964, 1965; Dales 1966). This was thoroughly critiqued by H.T. Lambrick (1967). R.J. Wasson determined that the unconsolidated sediments of the Indus Valley would not have had sufficient structural integrity to hold back the river (Wasson 1984).

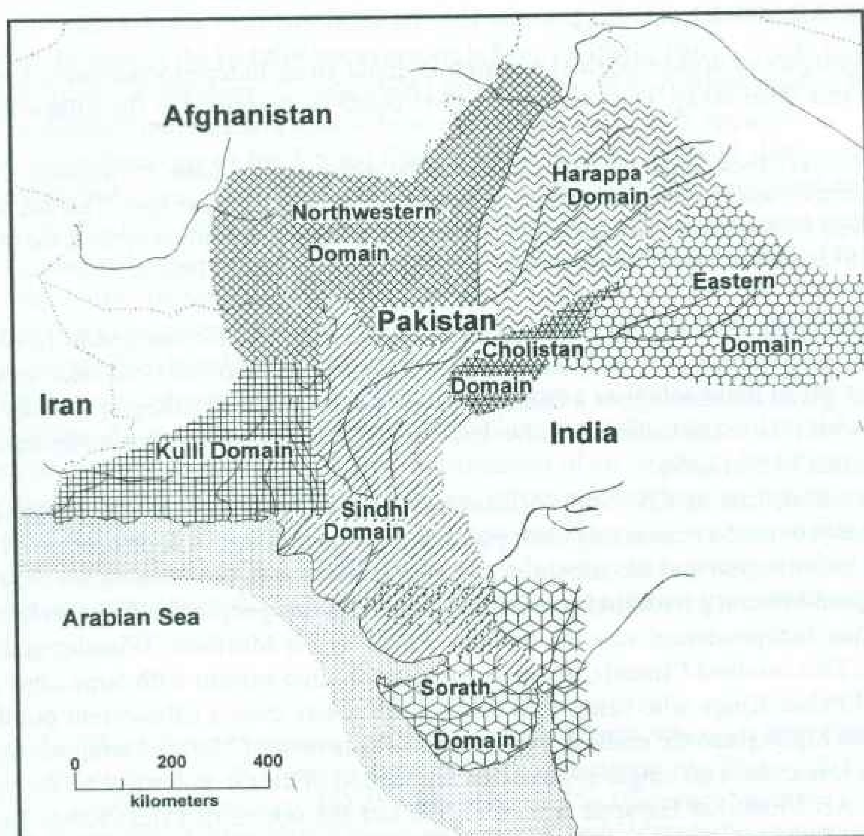


Fig. 10. Domains of the Indus Civilization (after Possehl 1996b)

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The Central Region or the Sindhi Domain admits a coastline on which are situated two modern-day ports, Karachi and Port Qasim. None of these two ports seemed to have played as dominant a part

Eastern in maritime trade as they play today. In an

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tiquity, or at least the part of the past that we have been able to uncover, Karachi was more or less a smallish settlement with some marine subsistence (1). It is possible that this settlement was also engaged in the domestication of animals and, later on, in some marginal level of pastoralism. There is no convincing evidence for the development of agriculture here till the historic times. It is surprising that the settlements around the bay were not rich in marine resources either. In all appearance, these settlements seem to a have an appearance of a series of temporary nomadic campsites who kept animals. In contrast, the nearby coastal settlements of Allahdino on

Possehl's Cultural Regions of the Harappan Civilization the Malir and Balakot on the sea shore have Fig. 10. Domains of the Indus Civilization (after Possehl 1996b) had a long history of habitation: the people were not only engaged in animal herding and agriculture but also exploited the marine resources that the Arabian Sea offered.The western sector contains some hilly area and flood-created lakes, such as Manchar Lake.

Indus is a very large river, as we know it to day. The same would have been true in antiquity, but important features of location and course would have been different and these would have had an effect on other variables such as volume and direction of flood. In the Central Region, Indus is a mature, meandering river, confined to a single channel during the winter months but inundating a vast flood plain during the summer floods.The immediate banks of the Indus in the Central Region are transitory features and can be dangerous to human settlement. The constantly changing course of the Indus and the frequent inundations in summer months must have formed a number of small lakes a little distance from the riverbanks. Here temporary or semi-permanent settlements must have been possible. These settlements were either to be built on higher ground or they must be secured by a protective wall. The early village farmers in this region employed both of these protective mechanisms. The settlements were built one above the other, using the debris of an earlier settlement as a base of higher elevation. In some settlements we also notice the protective walls of mud and mud-bricks.

It is assumed that the Central Region would have been home to the lowland species of mammals of the Greater Indus Region: the elephant and rhino would have been there, along with lion and tiger. The Indus river and its lakes and backwaters would have teemed with fish, which appears to have been important in the subsistence regime all through the formative age of the Indus Civilization. Well-developed gallery forests would have been found in the meander flood plain, far enough removed from the floods to allow trees to survive and well enough watered to have them prosper. Rich stands of reeds and other useful plants would be found around oxbow lakes and other wet features of the plains. Dominated by a broad, deep, mature river valley, the Central Region has been rich in fertile

earth and water, but shy in mineral resources. However, the limestone fields of Rohri Hills and those around the present-day Hyderabad provided the ancient man with high quality chert, which gave him a very important raw material to fashion his tools.

The rugged and desolate character of the western highlands is accentuated by the extreme sparseness of its vegetation. In spite of the altitude (over 2000 meters) rainfall is scanty. Nevertheless, it afforded excellent grazing to sheep and goats and to the wild ibex. A noteworthy feature of these hill rages was the development of gravel slopes at the base of the hills, forming a piedmont zone between the western highlands and the alluvium in the east. The plain immediately adjoining these slopes in the northern sector across the lower reaches of the Bolan River and Nari and Chakar *nais* is known as Kachi. It is formed of alluvium deposited from the hills, quite distinct from that derived from the Indus from which it is separated by a flat desert of claylike soil known as *pat* .

From the perspective of cultural and historical geography, Kachi is an extension of the Indus plains. It is an extraordinarily important place within the Central Region. Its inclusion in the Province of Baluchistan is only a political oddity. The Kachi Plain is generally spoken of as an awful desert of which no good is to be hoped. This is far from the truth. Kachi is a flat, alluvial plain, surrounded on all but the southern side by mountains. Many small



Manchar Lake, lower Sindh

torrents flow from these hills, but there are three sizable rivers: the Bolan, Nari, and Mula rivers. The Bolan Pass has been one of the most important routes from the Indus Plains to the highlands. In pre-historic times Kachi was something of a crossroads of culture because of this strategic location. As

will be seen later, Kachi figures out very prominently in the development of settled villages in ancient Pakistan.The archaeologically important site of Mehrgarh is situated in Kachi plain.

The Kirthar Piedmont and Sindh Kohistan are interesting and important areas for the study of the environment of ancient Pakistan in general and the early Harappan settlements in particular. The Kirthar Mountains are not a barrier to communication and movement between Baluchistan and the Indus plains. In fact it is an important area for travel. It is a shortcut to the south. Because this region is as much crossed through as is lived in, it has strategic importance as a link between Baluchistan and the Indus Plains. The survival of Baluch nomadfarmers is dependent, and was dependent, on winter access to the Indus valley. Conversely, the health of the valley herds of cattle, sheep, and goats is dependent, and was dependent, on summer access to mountain pastures. Reliable access to the passes was therefore necessary. There is, however, no evidence of any strife to control these passes in the ancient times. In fact, it seems that the symbiotic rhythm of life continued unobstructed throughout the ancient time.

Las Bela and the Winder Valley are two of the places through which Alexander the Great passed with his army in 326 BC on his return to Babylon. Las Bela is the location of a number of Kulli sites, most of which were recorded by Fairservis in the course of his 1959-60 work there. To the east, across the low, dissected by Mala Range, is the Hingol River. The surrounding area is home to many important archaeological sites including Mehi, Nundara, and Nal. The principal occupation of the nomads who lived and passed by was the raising of sheep, goats, and a few cattle.


Gorakh Hill in the Kirthar Range, to the west of Sindh

Valley, such as Thar Parker, are places where some agriculture is possible. These pockets afford grazing for large numbers of camels and goats and are unrivaled for the excellence and variety of the grasses. Thar Parkar is the natural corridor to Kutch, whether the route is directly over the salt wastes, or around the eastern end, to the north Gujarat Plain in India. The travel must have been, however, difficult in the best of circumstance. It forms a narrow corridor between ancient Pakistan and western India through which the two people interacted with each other. Nomadic herders still plod this area between Sindh and Gujarat.

The Gedrosia Region or the Kulli Country: The southwesternmost cultural, historical and geographical region of ancient Pakistan is located in the mountains of Baluchistan, known as Gedrosia to the Greeks. It is arid upland country incised by deep river valleys, flanked by rugged hills and mountains. Geographically, the region is part of a vast plateau stretching from the western edge of the Indus Valley to the eastern edge of the Tigris: a line approximating the modern boundary between Iraq and Iran. In the north of the Region, most of the precipitation comes in winter months. The southern parts fall within the weak, western shadow of the summer monsoon. The region, therefore, has the benefit of two seasons. By and large, the precipitation in both seasons is unreliable and rather scanty. As a

result, the region is an arid land. The way of life in this region is pastoral monadic, with village

An equally distinct tract, known as the plain of Las (Lasbela), extends about 90 kilometers northwards from the seacoast. It drains an area of considerable magnitude in Kohistan and is composed of alluvium deposited by the Porali, Hab, Winder, and Malir rivers. Yet another potential agricultural area lay about Lake Manchar. This largest freshwater lake in Pakistan was the the repository of water spilling from the flood-channels of the Indus, including the western Nara as well as the drainage of the hill country. During periods of inundation, it covers an area of over 500 square kilometers but shrinks to a mere 36 square kilometers as a result of post-monsoonal drying. This periodically changing level of filling and emptying thus affords an excellent arable land for cultivation, especially for the *rabi* crop.

Thar Desert, intervening between India and Pakistan is important from ecological point of view. It is a vast barren desert. However, in spite of the general aridity of the region, some fringes of the Thar Desert bordering the Indus


Las Bela plains; the Kirthar range in the background

settlements in the better-watered valleys, especially where simple irrigation or water catchment can be

managed or where water can be had from underground. The archaeological evidence shows that the same kind of pastoral nomadic culture existed in this region some seven thousand years ago as it exists to day. There is also a long history of permanent settlements in the Gedrosia region. A complete, unbroken sequence of habitation has been uncovered, including the famous Kulli Complex. The an important technological feature in securing the food supply for the inhabitants of Las Bela. The introduction of *Jawar* and *Bajra*, from Africa, apparently in the third millennium BC, was also an important ingredient in the evolution of agriculture in the region. Las Bela has a substantial coastline and at least one good port at Somiani located on a sheltered bay of the Arabian Sea. Between the Hab and Porali rivers is a small stream known as the Winder, associated with an important pre-historic site at

Balakot. The Winder was dammed in pre-historic times and provided irrigation for the surround



ing plain.

Most of the small valleys, and some of the larger ones, are basins of interior drainage, which can be salt waste. But, geology is such that under some conditions drainage is good, and the salts do not accumulate through evaporation, a fertile playa or *hamun*, which is suitable for cultivation. Some of them are small, a few hectares in size. Others are large, like the one in Isplenji on the northern frontier of Gedrosia region. These *hamuns* are formed of fine alluvium carried into well-drained

basins.

Ormara, Sumiani, Dhab, and several other minor ports serve fishing villages along the They are excellent for agriculture and have

coastline. A look at the map suggests Pakistan's central role in any traffic in the Arabian been one of the small-scale geographical vari
Sea, linking the Indus valley with the Gulf. The coastal regions in the west enjoyed

traditional mercantile intimacy with the east coast of Africa, albeit indirectly, from ables that have structured agricultural life and where the Indus man learnt the cultivation of African millets (*bajra* and *jawar*) during the location of ancient settlements since the the hey days of the Indus Civilization or probably somewhat earlier. These proved to be

important crops for the summer months, made double-cropping agriculture possible, and helped to produce the 'surplus' that was an essential element for sustaining the process

Nomads of the Thar in eastern Sindh



distribution of Kulli sites does not extend into Iranian Baluchistan. The work so far done has not yet pro duced a Kulli site in that region and the major exca vation at Tepe Yahya in Iranian Baluchistan yielded only limited evidence for contact with Gedrosia. The present southern border between these two modern states was in all probability a border in the third or fourth millennium BC as well.

From the perspective of cultural geography, the Gedrosia is the most complex of all the regions of ancient Pakistan. Human life in the Gedrosia re gion has been structured to a major degree by the shape of the land. The hills and mountains separate valleys and rivers of diverse nature. Most of the wa tercourses are small and not perennial. The overall structure of the region can be seen by looking south from the relatively high knot of mountains and val leys in the north around Kalat and the Harboi Hills. These give way and open up in a fan-like fashion as one moves south. To the east there is a series of parallel river valleys (Hab, Porali, Hingol) with streams flowing almost due north south. But to the west the rivers flow increasingly on a northeast southwest track. There is also a drop in altitude as one moves south, from Kalat to the sea.

Agriculture in Las Bela is made possible during the southwest monsoon by the presence of *bunds*. These small dams, which vastly increase the utility and effectiveness of the summer rainfall, are



A general view of the Makran coast

The Makran coast near Gwadar

of urbanization in the 3rd millennium BC.

By 3000 BC, the Indus people had started to sail the Arabian Sea and were in close opening of food producing era. contact with the people living around the Persian Gulf, most notably in the present-day Oman, Kuwait, Bahrain, United Emirate, coastal villages of Iran, and southern cities of From an historical perspective it should be

Iraq. The archaeological and textural evidence, to be discussed elsewhere in detail in noted that the Gedrosia region was home to wild barley and possibly wheat. There are also edible the southern part of modern Iraq. Textural evidence tells us that there was even a colony

wild plants that are important for understanding human settlement in the area. The jujube (*ber*) is part were even more important for sustaining the urban culture during 2,600 – 1900 BC. of the undomesticated local botany. Some hill slopes, in the higher elevation to the northern end of

the region, have good stands of pistachio, which must have played an important role in the food supply of the hunter-gatherers or even that of agriculturist-pastoralists. There is a wild prune, a wild almond and a wild olive in the northern portion of the region. The existence of wild date palms has been archaeologically attested right into the early settlement period.

These mountains and valleys were home to many animals that were exploited in antiquity. The presence of wild goat, wild sheep, wild pig, and wild onager (half-ass) has been archaeologically

attested to. These were later domesticated. Their shapes and sizes, however, changed in this process. There were, until recently, a number of important predators like wolf, Asiatic jackal, common fox, black bear, striped hyena, and leopard, which would have been found there in antiquity and would represent something of a danger to humans. The pres


Deserts of Gedrosia

populated by tribal peoples who speak a language that has some affinity with the Daravedian languages, akin to those concentrated in South India today. Although this affinity is presently questioned, this observation is important and it will be discussed subsequently in some detail.

The Gedrosia region presents a mountain front to the Indus Plains called the Sindh Kohistan or Kirthar Range. To the far north, above the Mula Pass, the eastern edge of the Harboi Hills serves this function. Major routes of communication onto the plains are found at the Mula Pass and the Gaj Nai, known as the Kulachi River in the mountains.

The third route is the great Bolan Pass, in a boundary or transitional zone between the Gedrosia Region and the Northwest. The Bolan is one of the two major gateways into the Indus Valley. Traffic between the plains and the mountains is not confined to these major routes, but they tend to be tracks for massive seasonal movements of people and animals, providing not only ease of access but also a ready supply of water. Actually, there are many smaller, well-used routes through the Sindh Kohistan that are traveled by small parties of people in their day-to-day lives. The same pattern likely persisted in the pre-historic times.

The high, northern portion of the Gedrosia region is dominated by the Harboi Hills, composed of successive, parallel mountain ridges, which rise from the Kachi plains. They reach a height of about 3,000 meters. The drainage generally flows to the north, into the Bolan Rver. Just to the south

ence of tiger is not attested but the Asiatic lion, long extinct in the region, might have been present in the Gedrosia region during pre-historic times.

There is a great deal of coal in the Gedrosia region, not that the ancient peoples of the area used it. More important is the presence of old slag heaps from copper smelting in Sarawan and at many locations in the Chagai Hills. The use of bitumen has been attested to by archaeologists. It was used in fashioning some of the composite tools that the early settlers used in pursuit of their agricultural activities. There is also lapis lazuli in the Chagai Hills, and the use of this source has been documented at Shahr-i-Sokhta in Iran. The old notion that the only ancient source for lapis lazuli was in the Badakhshan region of northeastern Afghanistan has been shown to be incorrect. There are reports for the presence of turquoise in the Chagai Hills but this information has not been verified. If it is true, then the turquoise beads found at certain Gedrosian sites of early settlements need not be traced to Iran (1).

Kalat is the largest subregion within the Gedrosia region. This is Brahui (Brohi) territory,



A modern settlement in Baluchistan

of the Harboi are the headwaters of three important rivers, the Kulachi, the Hab, and the Porali. The Hab River is the easternmost of the streams that flow north south in the Gedrosia region. It, along with its tributary, the Saruna River, are perennial for the most part and debouche directly into the Arabian Sea, not the Indus. There are two interesting archaeological sites in the valley. One is an AmriNal settlement at Diwana, associated with an ancient dam for storing water and silt runoff. The second is a small settlement of later age at the mouth of Hab Chowkie.

The area known as Makran lies across the southern, seaward side, of the Gedrosia region. It includes the entire drainage of the Kech and Dasht Rivers, up to the watershed of the Rakhshan Valley and the Makran Coastal Range, including the relatively small Bhari River flowing to Pasni on the coast and the Basul just to the west of Ormara. The Makran is the land of the *Ichthyophagoi* people whom Alexander the Great met on his passage out of Las Bela and the region in which so many of his troops were lost. Arrian described this journey in along the Arabian Sea. In the early historic times, the

people of Makran were known as seafarers and there is evidence of substantial sea trade between the Indus Valley and Mesopotamia along the Makran coast as early as 4th millennia BC. During the earlier settlements, a substantial inter-coastal communication between the various fishing settlements along the coast must have worked as a common denominator for the cultural development of this area. The people of Makran seemed to have a long lasting relationship with the peoples of Oman and the Persian Gulf. These relations are still very strong.


An oasis in the middle of desert in southern Baluchistan

details. The description of this portion of Alexander's return to the west is instructive in that it describes a country much like the one we see today: rather bleak, waterless, except for oases, a land of little food and a place of danger for large numbers of uninvited guests.

There is, of course, some agriculture in Makran. It has been so in pre-historic times also. Dates were apparently taken in great quantity in a variety of different guises. Fish were often consumed raw, just as reported by Arrian in his description of the *Ichtheophagoi*. Fish were also dried and then boiled at mealtime. A fishmeal was prepared and made into thick *roti* and eaten as a kind of bread. *Jawar* bread was common but wheat also existed. Rice was introduced here after the demise of the Harappan Civilization, ca. 1500 BC.

Makran has not been well surveyed for archeological sites of pre-historic time; nor have the

development of early settlements have been properly mapped in this area. Some archaeological sites, however, do exist, the most important of which is Sutkagen-dor on the Dasht River, close to Pakistan-Iran border. A few coastal settlements are known, such as Sotka-Koh, Balakot, and Allahdino,

Northwestern Region: The Northwestern Region consists of Baluchistan north of Kalat, Quetta-Pishin, Zhob, Loralai and Mari-Bugti country and major part of the present day Pakhtunkhwa Province including Swat, with an outlier in southern Afghanistan, to accommodate Mundigak, Said Qala and a few other places. The domain extends out to the Chagai Hills. It is the largest of the regions. In many ways it resembles the Gedrosia Region, with mountains and narrow valleys, restricted cultivable soils and the same suite of native fauna and flora. The vale of Peshawar has no pre-historic archaeology, but it is, or could be considered, part of the Northwestern Region as well. Within historical times the southern districts of the region have been a transitional area between Baluchistan to the south and Pashtun country to the north. The Indus River is the eastern boundary of the Northwestern Region.

The joint valleys of Quetta and Pishin are taken as the southern boundary of Northwestern Region, since the Kulli materials do not reach this far north and it was a center for a distinctive way of life during antiquity. The Bolan Pass rises gently off the Kachi Plain and enters the mountains at the northern end of the Kirthar range. It breaks through the mountains clearly and suddenly at about 1500 meters above the sea level into a broad, flat valley, surrounded by high peaks, that rise suddenly off the valley floor. A direct route through Quetta, to Pishin further west is over 100 km to the Khojak Pass. This is the route through low mountainous western edge of the valley system, but borders the Registan Desert and leads on to Kandhar in Afghanistan.
The Quetta-Pishin Valley is basically flat or

undulating, and enjoys a very tolerable summer climate that is warm, occasionally hot, but dry. There is almost never summer rain, or enough that can be counted on agriculture. The winters can be cold and frequently freezing. Winter westerly brings rain, sometimes snow, to the area, which produces a good crop of wheat and barley. The altitude and climate are agreeable for orchard crops like apples and other fruits. and cattle. The Pishin, Lora and the Hanna River are both perennial streams in the valley and are additional water sources for farmers and herders. Quetta also has some artesian wells and small streams that emanate from the foothills of the mountain ranges surrounding the valley floor. The rain and snowfall, as meager as it is, provides for posture and this in turn, with annual transmigration to this valley and Indus lowlands, provides for relatively large herds of sheep, goats and cattle. The archaeological evidence shows that the same or similar climate and similar pattern of life existed in the pre-historic times in this area.

The Quetta-Pishin interconnected valleys are immensely important for the study of the prehistory of Pakistan. They have sustained village life and pastoral nomadism for many millennia and have vigorously contributed to the development of urban culture in the area. The aceramic remains from Kili Gul Mohammad Period in Quetta Valley, are undoubtedly contemporary with the remains


A nomad household undertaking its seasonal migration between Afghanistan and Pakistan

from Mehrgarh, at the base of the Bolan Pass. This documented evidence places early settlements here as early as seventh millennium BC. The natural resources necessary for food producing revolution are all here, with the exception of perhaps wild wheat. Quetta-Pishin Valleys were therefore on the cutting edge of agricultural revolution during the seventh millennium BC. It was a harbinger of similar developments across the Indus Valley. Modern archaeological discoveries also point to the wellfounded speculation that this agricultural revolution quickly spread to the Kandhar area across the Quetta-Pishin Valley onto Turkmenistan and inbetween. This observation is especially important to the spread of wheat cultivation in those areas. While archaeological work has not yet documented this fact, same is probably true for the Zhob-Loralai and Mari-Bugti country, just to the north of Quetta.

The principal geographical feature of ZhobLoralai and Marri-Bugti country is the Sulaiman Range, which fronts the Punjab on its eastern side. It begins at the Gomal Valley and terminates in southern Murri-Bugti country 400 km south of its beginning. The backbone of the range is a single high ridge with its highest peak, Takht-e-Silaiman, at about 3500 meters. There are no large rivers in this region but the Zhob River is perennial and has probably supported agricultural settlements since the very beginning of food production and herding in the region, especially the cluster of sites found around Fort Sandeman, including Periano Ghundai and Moghul Ghundai. The Zhob arises in the eastern watershed of the Pishin Valley and flows about 400 km to a junction with the Gomal. It is a broad, shallow, sluggish stream for much of its course, with shallow pools appearing at many places. An important pre-historic archaeological site, Dabar-Kot, is situated in this general region. The area is more suited to pastoralism than agriculture.

Waziristan is mountainous area of four reasonably fertile valleys along the modern border between Afghanistan and Pakistan. In terms of environment and subsistence this area is much like the other parts of Northwestern Region. The Bannu basin is a roughly circular valley about 50 km across. A joint archaeological project has been undertaken there since the mid-1980s with participants from the University of Peshawar and the archaeologists from the United Kingdom. The basin is diverse environments, ranging from dune field and huge boulder fans, associated with Kurram and Gumla River drainage, to relatively rich agricultural field. There is evidence that part of the Basin was filled with lakes in the not too distant past. Kohat is a splendid small place, elevated enough to be almost comfortable in the summer, and low enough to have tolerable winters. There are no major rivers in Kohat region but numerous hill torrents, mostly active in winter, and afford limited potential for irrigation. The area is covered with thin grassland and what little forest there is, is stunned.

The Derajaats is the low plain between the mountains of the Northern region and the Indus River. It is so named because it contains three *Deras*: Dera Ismail Khan, Dera Fateh Khan, and Dera Ghazi Khan. As a whole, the area is low and hot, with poor monsoon showers and a small amount of winter rain. The treeless plain is not even provided with grass and pasture resources. Some settlement is afforded where hill torrents from the Sulaiman Range cross the plain on their way to the Indus. It is generally presumed that the situation here was somewhat better in the pre-historic times and it may not have been as inhospitable to human settlements.

Gomal Valley, around Dera Ismail Khan, is somewhat important from archeological point of view and especially in context with the development of agriculture and village life in Northwestern region. The Gomal Valley is also flat and treeless with a very hot summer and almost no relief by monsoon cloud cover, let alone rainfall. The valley is drier than either Bannu or Dera Ghazi Khan. Over the long term this valley has been occupied by village farming communities, especially in the east, near the modern city of Dera Ismal Khan, which has been documented by excavations at Rehman Dheri, Gumla, and Hathala. The work at Gumla indicated that the first settlement was an aceramic village, comparable to Mehrgarh I and Killi Ghul Muhammad I. Gomal River affords good communication to the uplands of Waziristan and into Zhob-Loralai. A low pass gains access to Bannu to the north. These routes have been used by invaders from Iran as



Northern Region or the Harappa Zone: The Northern Region is approximately coincident with Punjab. The rough boundaries of this Region are the Sutlej River on the east, and the Indus on the west. The Pothwar Plateau and Salt Range are included but the Cholistan Desert on southwest is not included for the reasons to be seen later. The foothills of the outer Himalayas mark the northern boundary. There is a geographic continuity from the west to the east as one crosses the Indus and leaves the mountains of the Pashtun country and moves to Ganges valley through a narrow northern corridor along the Siwaliks. This passable corridor, as mentioned before in this chapter, is today quite wide but it was rather restricted in the ancient times due to the impassable jungles in northern Punjab in the south and the high mountains in the north. In most respects the Northern Region is practically one unit, without any subgrouping. There are no sharp divides, barriers, or abrupt changes in landform, rainfall, temperature, fauna or flora. Only the Pothwar Plateau and Salt Range display a different geology.

A general topography of the Pothwar Plateau

well as from Central Asia. On the basis of this historical evidence, it should not be a problem to assume that movement of men and animals did take place in pre-historic times as well.

Dera Ghazi Khan region is as dry and hot as Dera Ismail Khan region but its proximity to the Indus and its frequent flooding gave this area a semblance of livable place. Because of the alluvial soil and the Indus moisture, Dera Ghazi Khan is considered today as a productive area. Its position in the ancient time, however, may not be as favorable as it is today. Its importance in pre-historic times is probably derived from the availability of red ochre and some copper ore (1).
The Northern Region as a whole is an immense rolling plain. The fall of the rivers is

gentle; less than one meter to the kilometer in the north, where it is the steepest. In most of the area the slope is about 30 centimeters per kilometer. The principal physiographic features of the Region are the entrenched rivers and the humpbacked *doabs*. Doabs are the areas between two rivers; they are sometimes also called *bars*. In elementary schools in Punjab, pupils used to sing:
Sindh Sagar Doab separates the Jehlum from the Sindh (Indus)

Chajj or Chammba Doab separates the Jhelum from the Chenab
Rechna Doab is between the Chenab and the Ravi
Bari Doab wedges between the Ravi and the Sutlej-Beas.

These tributaries to the Indus are large rivers themselves and should not be thought as benign little streams that combine to form one mighty river. Sindh Sagar Doab, also known as the Thal Desert, is a

sandy tract, which has responded very well to recent irrigation projects. In pre-historic times it would have been a desert, the driest and unusable area in an otherwise productive region. There are, however, Kot Dijian sites in this sandy terrain which sows that it was somehow inhabited.

In the north, with the steeper gradients and somewhat deeper entrenchments, the river courses have been relatively stable, but as one moves south there has been long term variation in topography. Before the canals most of the Northern plains were grassland with green strips of riverine growth traversing it at periodic intervals. The pastures were exploited by the many cattle keeping peoples of the area who used the riverine strips for cultivation and as reliable sources of water for themselves and their large herds. One peculiarity of the *daobs* or *bars,* in comparison with the alluvial plain of Sindh, is that the water level of all the rivers is lower than the surrounding plains. It was, therefore, not possible for the early inhabitants of the Punjab to use the river water for irrigation. This is probably the reason that very few Indus settlements could develop in Punjab west of the Ravi. Possehl (1) speculates that this area was not devoid of human habitation but these people relied more on hunting-gathering and animal herding for their subsistence instead of agriculture.

Huge deposits of rock salt are found on the surface as well as in deep deposits in low range of hills, known as Salt Range. It forms the northern boundary of the Thal Desert, extending from the Indus northeast for about 120 km. The Salt Range is the southernmost rampart of the Himalayas in Pakistan. It is a single ridge for most of its length, with a steep, forbidding southern face and about 500 meters of relief on the average. This bleak and barren, rugged crest separates the dissected, varied uplands of the Pothwar Plateau from the monotonous alluvial plains of the Indus and its tributaries. This formation may have provided salt for the pre-historic population of northern Pakistan. A Kot Dijian site at Musakhel, on the southern edge of the Salt range was probably occupied in late Kot Dijian times

The Pothwar Plateau is a heavily dissected region north of the Salt Range. The rivers of the region are generally found at the bottom of deep erosion gullies and small valleys, making them unsuitable for irrigation. This region has a rich history centered on Taxila Valley, near Islamabad. Kot Dijian sites, especially the well-excavated mound at Sarai Khola at the mouth of Taxila Valley, attest to the presence of the village farming communities in the area from the fourth millennium BC, if not earlier. The famous Soan River flows through the Pothwar Plateau and the initial research has yielded abundant evidence for the presence of man there more than a million years ago.

This region is important from archaeological point of view as well as from geological point of view. Even more important is the study of this plateau for anthropological reasons. However, so far little settlement activity has been noticed from the Harappan Civilization. Possehl theorizes (1) that the region was not devoid of population but lacks archaeological remains because the people were nomadic pastoralists.

There is a vast mountainous area included in the Northern region. Archaeologically, however, it is

not of much importance because of scant evidence for human occupation in ancient times. Settlements of the so-called Neolithic are present in Kashmir and a certain amount of interaction between them and the plains is known because of a Kot Dijian pot found at Burzahom. Kashmir was definitely known to the Indus people, probably from the early stages of settled villages in this area or a little later. These Neolithic settlements were contemporary with the Harappan Civilization.

Before we leave the Northern region, mention must be made of the truly northern territories of Pakistan. This is a hilly area and the world's highest peaks are located in this region. Compared to the mountains of Baluchistan which hardly see any rain during the year and only a few selected regions experience any snow, the northern mountains are a part of the Himalayas, the Hindu Kush and the Pamirs. This region sees much more rain and experience substantial snow. The moisture collected in these hills drains into the various rivers of the region which eventually get consolidated into the major rivers of the Punjab, mentioned above. Since arable land is limited, the area is very thinly populated. Still, we find in the archaeological record that human population did exist in these mountains and valleys as early as Mesolithic times. The rock paintings in Chilas is the evidence. Culturally, these highlands have been the conduits for communication between Pakistan and the Chinese Turkistan. Swat, Chitral, Hunza, Ladakh, etc. present a breath-taking scenery of this mountainous area. From the point of view of the Harappan Civilization, this area is rather unimportant.

Hakra Region or Cholistan Domain: In the pre-historic times, there was a small braided river that originated on the Indian side of the northeastern border between India and Pakistan. Geological evidence shows that it flowed a little distance on the Indian side of the border, entered into Pakistan, flowed some distance on this side of the border and then dried up in the region of Derawar Fort in Bhawalpur. There is some other evidence that shows this river falling into the Indus a small distance south of Derawar Fort. Geological studies further show that the river flowed largely in the form of a braid, the channels changing their courses frequently. This ill-defined, mostly dried up river is called on the Indian side of the border as Gagghar. On Pakistani side, it is called Hakra. Its basin is now a part of the great Thar Desert. The portion of this dry area within Pakistan is known as Cholistan, comprises of the Bhawalpur Division, and politically a part of Punjab.

The Harkra region is made up of alluvial soils that have been extensively worked over and over again by wind and water. Some of it is now covered with sand dunes over 100 meters in height. The low, dry river beds carry some water during years with good monsoon in the Siwalik and have water near the surface that can be tapped by wells Much of the area is grassland, richly green in the summer and winter rains. In this sense, it was, and is to day, a vast pastureland, used by nomads for many millennia. Not much can be read from the current environmental conditions as we have been able to do for other regions. The complicating factor is the presence of river system, the nature and history of which is not known. Neither do we know for certain if this river system was only seasonal or perennial. Furthermore, some pre-historians, especially the new breed of ultra-nationalist Indian "scientists" or the "Vedic scholars" take it as a matter of faith that this elusive river, called in their parlance the Sarasvati, fell into the Arabian Sea independent of the Indus, while other scholars make it a part of the Indus system, insisting that Gagghar-Hakra plains were an integral part of the Indus system. Mughal and some other archaeologists make it disappear into the desert in the general area of Derawar Fort, making some allowance that in its flood time it could have emptied into the Indus. Suffice it be here that there was the availability of water in this region in pre-historic times. Whether this availability was seasonal or perennial, it was enough to induce the ancient man settle in this

region.

Various theories have been advanced for the conspicuous changes that have taken place in the Hakra river and its flow through the Mehran. Some scholars postulate that at one time the river Yamuna flowed westward through a chnannel such as the Western Yamuna Canal or the Chautang and fed the Hakra. In the alluvial tract of Bhawalpur the existence of several depressions and paleochannels, indicating dried-up river beds, seems to bear testimony to the link between the two rivers, perhaps a flow of the flood waters from the Beas-Sutlej linked when the latter flowed further south.

There is an increasing tendency among some Indian archaeologists and prehistorians to treat the Gaghar-Hakra river braids and their floodplain (which they generally refer to as the 'Sarasvati') separate from the Indus and its floodplains (which some of them refer to as 'Sindhu') as though they were two independent river formed two definable geographic ously, some misplaced political motives are involved. The fact remains, however, that geographically the Indus and Gaghar-Hakra plain is one single continuum and that the local population of Sindh has never made any distinction between the channels of the Indus and those of the Gaghar-Hakra, which they collectively call the *Mehran.*

In spite of all the controversy about the identification and composition of Gaghar-Hakra river, the Hakra basin of Cholistan has been shown to be thickly populated in the Early Indus period as well as in the Mature Harappan period. Some of these settlements, both the Early Indus and the Harappan, also spilled over along the river basin into the present-day India. During the postHarappan times, there is strong evidence that the settlement number in the Cholistan side decreased and in the Indian side increased. This is presumed to be the result of the drying up of the GhagharHakra.

M.R. Mughal, did an extensive survey of this region and found an astonishing number of Early, Mature and Late Harappan settlements, which were visible just on the surface. The signifisystems and

regions. Obvicance of this discovery is enormous and it will be discussed in details later in this book. The artifacts found at these sites were of such a unique nature that Mughal treated this region separately from the northern region, described above. Other archaeologists have dealt with these settlements in the same fashion. Although there is no geographical reason to do so, it is better to follow the convention for archaeological reasons.

Northeastern and Southeastern Regions: There are two small regions on the Indian side of the Indo-Pak border that are traditionally considered to be parts of the Greater Indus Culture. One is a narrow strip of land on the northeast of the border, comprising of the Indo-Gangetic Divide, along the the Siwalik Hills. This strip of land communicates with the dry riverbed of the Gaghar-Hakra. Geographically, this area is a part of the Indus system because the Sutlej and the Beas empty into the Indus, so did the Gaghar-Harkra when it flowed.

The other such area across the Indo-Pak border constitute the coastal Gujarat and the Kutch. This is a larger area than the former and geographically constitutes only a part of the Indus System., the Indus Delta. The significance of both these regions is great as the former represents an extension of the Indus culture throughout the greater Indus Valley while the latter represents its colonization by the ancient Indus people, perhaps before the rise of the Harappan cities in the Indus Valley. The study of both of these regions is particularly important for the urbanization of the Greater Indus Valley and its spillover into the neighboring area.These regions are also of considerable significance in the study

of the spread of agriculture in the rest of the subcontinent. Furthermore, their importance lies in the fact that these were the corridors through which the Indus people interacted with their contemporaries across their natural borders.

Possehl treats these regions as two distinct cultural zones or two separate Indus Domains. Many other archaeologists also follow his lead. According to this author, however, there could be some justification for taking the Kutch and Saurashtra as a discrete cultural and geographical region but one finds little reason for treating the Divide as a separate cultural domain. It would probably be better if we consider the Harappan influence in this area as a mere spill-over of the Indus Civilization into the easternmost area of its natural 'homeland', i.e., the Indus Valley.

The situation in the Kutch and Saurashtra, however, seems to be different. Here a distinct shade of the Indus Civilization is in view that differs from that of the core area in several aspects. Additionally, there is a difference in chronology also. Most of the Indus settlements in Kutch and Saurashtra have been shown to be later than the core areas and some of them continued in existence even after the demise of the Harappan Civilization in the core area.

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The most noteworthy river of Pakistan is, of course, the Indus. Rising in Tibet and flowing for a great part of its length in the Himalayas, it then

The situation in the Kutch and Saurashtra,Ancient Pakistan - An Archaeological Historyemerges into the plains of the Punjab, and flows however, seems to be different. Here a distinct

The Indus River System: The Indus sys

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have played an important role in the economic life The Indus sys**The Indus River System:**
of the Greater Indus Valley and the borderline areas
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build up their beds with material they have not the
strength to carry, and are subject to seasonal or
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Darband. Thereafter it is met by tributaries, bringingSuleman range (Kurram, Tochi, Zhob, Gomal Rivthe drainage of the Hindu Kush (Kabul river), theers, etc) and further downstream, at Panjnand, the
Suleman range (Kurram, Tochi, Zhob, Gomal Riv
accumulated waters of the Punjab rivers. Down
ers, etc) and further downstream, at
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The gradient of the river in
an area of 372,000 sq.km.The average an

the Sind region, 4.8 centimeter per
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about twice the flow of the Nile and over

fact that its bed is generally higher ten times that of the Colorado River. During than the surrounding plan, and the fall
floods the river in the plains of Sindh can of the country is nearly 13 centimeters

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cm per kilometer in Sindh the river 'is so
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its channel to carry large floodThe Indus annually transports 150 milliondischarge, and 2) the vast quantity of
tons of silt to the sea.The high sediment
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load — which here is laid down at the rate

between Rohri and Sukkhar, where it
of 1–2 meters per millennium — is a most is confined to a narrow gorge between

limestone
hills,
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has
important feature of the rivers in the area, frequently
since rivers with beds that are not cut into
shifted its course as is evident by the
groundrock are easily deflected by floods
existence of abandoned courses, cut
off meanders and braiding channels.
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are more stable, flowing instrength to carry, and are subject to seasonal or firmly incised channels, andflash flooding and frequent lateral movement of their tending throughout the major channels. Those in regions of somewhat higher, shifted nearly 160 kilometers to the west, and it no longer empties into the Rann of Kutch as it is reported to have done during the time of Alexander. With the rapid rate of aggradation, the Indus delta is thought to have extended nearly 80 kilometers during the last two millennia.

As against this, the rivers of the Punjab have broad alluvial plains with beds below the genpart of their courses to cut down rather than build up their beds.

Themostnoteworthy river of Pakistan is, of course, the Indus. Rising in Tibet and flowing for a great part of its length in the Himalayas, it then emerges into the plains of the Punjab, and flows across the Pothwar Plateau, moving to Attock, where it is joined by the Kabul River and then passes through the Salt Range on to the lowlands of the Punjab. Its course is basically straight and


The Indus River as it flows in the Bukkur Gorge between the towns of Sukkur and Rohri

or by tectonic movements. Crustal activity is continually active in the northern subcontinent, as the peninsula, driving northwards against the continent of Asia, produces the compression upthrusts that have caused (and are still causing) the Himalayas to rise. Only the high rate of erosion of such fold mountains made of sedimentary rocks keeps them from rising ever higher. The mountains’ height, extent and recent origin have greatly affected the climate of southern Asia and turned the interior behind the massifs into cold high deserts.

Thus, topographically, the Indus culture area appears as a larger, reversed analogue of Mesopotamia, with a desert, the Thar, on the eastern flank, hills (Baluchi) on the west, and with two main rivers (Indus and the now dry Ghaggar-Hakra) flowing from lower mountains in the north across alluvial plains to the sea in the south. The most pronounced similarity, though highly unsurprising, is that settle



has frequently shifted its course as is evident by the existence of abandoned courses, cut-off meanders and braiding channels. In its lower reaches it seems to have shifted nearly 160 kilometers to the west, and it no longer empties into the Rann of Kutch as it is reported to have done during the time of Alexander. With the rapid rate of aggradation, the Indus delta is thought to have extended nearly 80 kilometers during the last two millennia.

As against this, the rivers of the Punjab have broad alluvial plains with beds below the general level of flood plain, and are characterized by high ground between them which is unaffected by the floods. In spite of this feature, great changes have been observed in the courses of the Ravi, Beas and Sutlej. In the past the Ravi used to flow further south with its confluence with the Chenab and Jhelum a little below Multan. At one time the Beas also appears to have followed an independent

course to the Indus without joining the Sutlej. The existence of this ancient channel is clearly visible in the mosaic of lands on imagery of the area.

The Jhelum flows through Kashmir before coming down to Punjab. The Jhelum and the Chenab unite and their combined flow meets the Ravi. The Beas flows entirely through the Indian territory. It flows

into the Sutlej which flows for about 1500 km before joining the Indus. The flow of Sutlej is partly in the modern-day India and partly in Pakistan. Traditionally as well as historically, Sutlej defined the eastern boundary of an

Indus River in the South

ment followed river courses in both regions. The mouths of the Indus open to the Arabian Sea southeast of Karachi (Pakistan's main port and largest city), while the Makran ranges of mountains extend westwards along the coast to the Strait of Hormuz, the 'Gate' of the Gulf, which extends northwest to terminate as the southern shores of Mesopotamia. Be tween the twin cities of Sukkur and Rohri, some 90 kilometers upstream from Mohenjo daro, the Indus cuts a gorge through predomi nantly limestone hills. This Sukkur Gorge in the



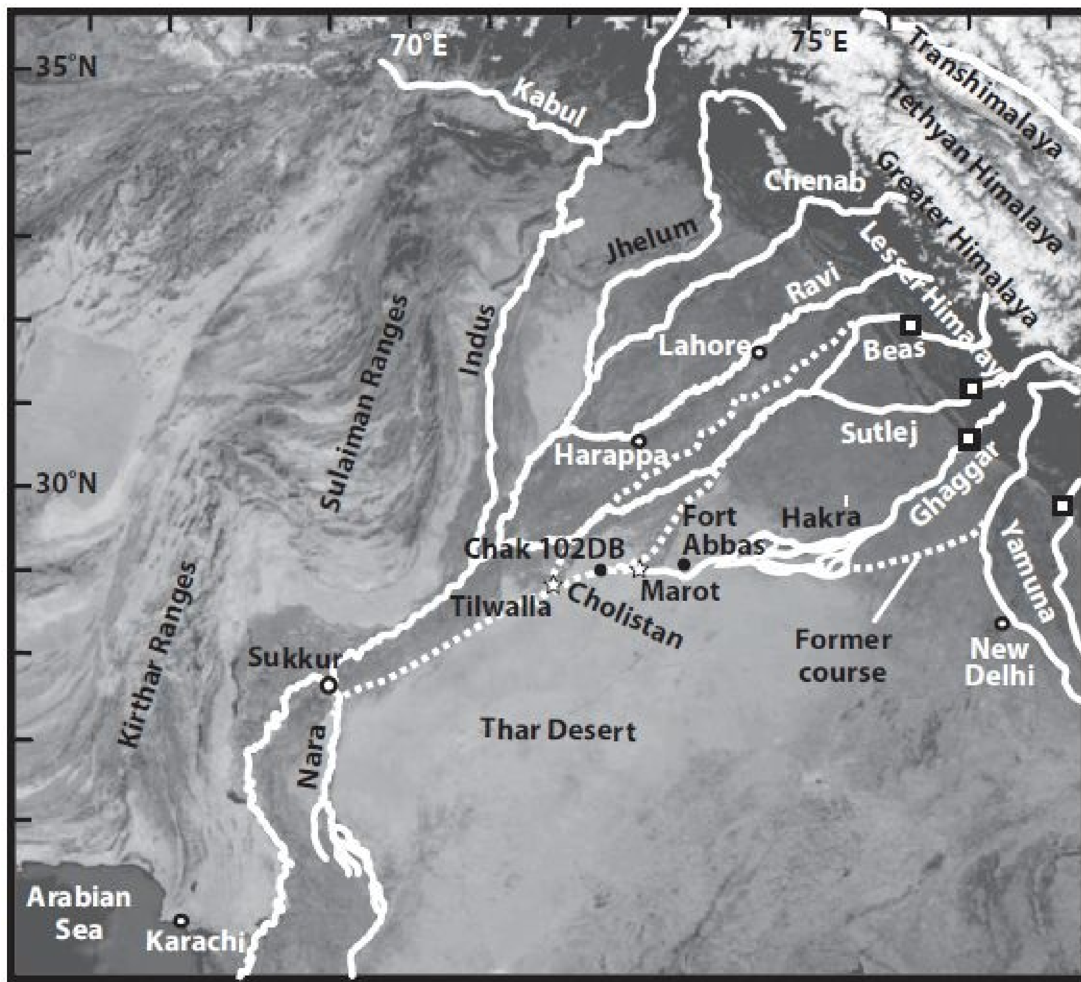
Indus in flood in the lower Indus Valley

Rohri Hills supplied the light-buff chert that provided the vast majority of stone blades for Mohenjo-daro and other urban centers.
The gradient of the river in the Sindh region, 4.8 centimeter per kilometer, which viewed against the fact that its bed is generally higher than the sur rounding plan, and the fall of the country is nearly 13 centimeters per kilometers, makes it prone to periodic flooding. The flood plain sometimes ex tends to a width of 16 kilometers. This seems to

result from two characteristics: 1) the insufficiency of its channel to carry large flood-discharge, and 2) the vast quantity of silt suspended in the water. Ex cepting between Rohri and Sukkhar, where it is con fined to a narrow gorge between limestone hills, it
cient Pakistan. In cultural terms it also defines the present boundaries between the present-day India and Pakistan.

It is evident that one of the major lifelines of the Indus civilization was its river systems. The Harappans did not construct irrigation networks, as was the case among their contemporaries in Mesopotamia; instead, they depended on the annual flooding cycles of its major rivers. The timing and velocity of water flowing into the region varied seasonally, but the most dramatic changes in the landscape were the result of long-term processes, involving shifts in the locations of the rivers themselves and the amount of water they discharged. A new picture of the location of the river systems is emerging through the use of aerial photography, remote sensing imagery, regional surveys, and geoarchaeological research. Our best documentation of these changes is from the Lower Indus and the Ghaggar-Hakra. While there is still debate about which of the paleochannels traced in Sindh was occupied by which river at which time, a likely sequence of changing courses has been established. Currently, the course of the Lower Indus has remained relatively stable due to flood protection embankments along the river that shield it from their banks is helpful, and establishing the sequence and significance of changes is a formidable task. There is not yet full agreement on the history of the Ghaggar-Hakra braid system, and continuing work often brings changes to the generally accepted picture. At present it is thought that, during the Indus period and in earlier times, the rivers rising in the Siwalik Hills - the Ghaggar, the Wah, and the Chautang - were augmented by the waters of the Yamuna, flowing in the current bed of the Chauung. During the Harappan period, the water of these rivers is said to combine to form a great waterway that flowed through the now arid region of Cholistan in the Thar Desert.

the western mountain streams and the piedmont region. Importantly, the Sindh project has docu mented major changes in the Lower Indus that involved significant differences between its pre sent course and those prevailing in Harappan times.



Complexities of river courses is also evident in the upper Indus plains. Water sources were most plentiful along the active floodplain such that the selection of settlement locations were dependent upon the extent of lateral migration of the rivers across the plain. An additional feature is the buildup of "bars," or raised land areas, accompanying channel shifts, displacements, and the creation of a low-grade meander and scroll topography within the broader alluvial plain. These alluvial changes created surfaces that were sufficiently high to have been unaf
fected by floods (18).

The Ghaggar-Hakra: The most dramatic change took place in the region east of the Indus River, where there is some evidence that a sizable river system flowed in the Harappan period. Through ground survey and methods of remote sensing such as satellite photography, many stretches of dry riverbed have been traced in the Thar Desert and in the Indo-Gangetic divide, often as much as 10 kilometers wide, showing that they once held substantial river courses. The shells of freshwater molluscs found in their banks tell the same story.

Today a number of small seasonal rivers rising in the Siwalik Hills occupy a narrow channel running for a short distance in some of these dry riverbeds. A large concentration of Harappan and other prehistoric settlements has been discovered here, and it is clear that the drainage of the region has a complicated history. Many names are attached to different parts of the drainage, including

the Hakra in Pakistan and the Ghaggar in India; so, for the sake of clarity, scholars frequently refer to the whole drainage system as the Ghaggar-Hakra river system. Some Indian archaeologists, and in imitation, some western scholar also, prefer to call it Sarasvati, after a mythical or real river mentioned in the RgVeda.

Dating ancient river courses is a knotty problem, although the date of settlements along

Ghaggar-Hakra River

Today, the relict channels of the GhaggarHakra disappear into the semi-arid regions to its south. These changes in the present position of the Ghaggar-Hakra occurred over a period of several thousand years. The study of paleosols conducted by Marie-Agnes Courty (16) indicates that between 4000 and 2500 years ago. (*ca.* 2000-500 B.C.), during the period of drier conditions, there was reduced seasonal flooding and concommitant retreat of the primary drainage arteries 100 to 150 kilometers northward. It is unclear from the study, however, when a predictable seasonal flooding cycle ceased. The course of the Ghaggar-Hakra is still uncertain. Recent work has uncovered evidence of a possible inland delta near Fort Derawar, and it has been suggested that the river braids may have ended here, running into the sand in a fan of distributaries. There is also some evidence that the Ghanar-Hakra split into two beds near Fort Derawar.

It is generally conceded that the changes in the drainage network were most likely the result of two interacting factors involving the Yamuna River that runs east of the Ghaggar-Hakra and is now part of the Ganges River system. In this tectonically active area, the slope and topography of the plain may have been altered. In addition, the natural aggradation of the upstream bed of the younger Yamuna River system may have caused periodic floods that deflected the river across the watershed between the Indus and Ganges systems. The whole emphasis is to make the Gaghar-Hakra a snow-fed perennial river, nourishing a great many settlements at par with the Indus, attempting to claim the Indus Civilization the gift of “Sarasvati” and thus making it outright Vedic.

The fact is, however, that a snow-fed river has not been essential for the establishment of human settlements and the development of agriculture. Neither has a roaring river been of any particular benefit for the early settlements or for the rise of mighty cities on its banks. Man preferred small rivulets to locate his settlements rather than large rivers. He preferred semi-arid land with limited availability of water for his preferred abode. All in all, he avoided large rivers and thick vegetation. Thus, there is no need of proving the existence of a roaring “Sarasvati” mother-river to explain the existence of a large number of agricultural settlements around the Ghaghar-Hakra river. The compulsion for making the Yamuna, the Sutlej, the Beas, and the like to merge into a smallish monsoonal river largely stems from the emotional need of some of the Indian archaeologists and prehistorians to connect the Sarasvati, a mythical river of the Vedas, to the Gaghar-Hakra river and thereby place the Aryans squarely in the Haryana and Punjab region. This is, of course, a “Vedic scholarship”, not a scientific enquiry.

Much has been talked about the remote sensing imagery of old river beds in Punjab and Rajasthan. These images do indicate some river beds that possibly emptied in the Arabian Sea. The widespread

presence of alluvium in the desert indicates that at some time a river flowed in this region. However, for a stretch of around one hundred and fifty miles to the southwest of Derawar no relics of ancient river channels can be traced. Under these circumstances, a recent multi-discipline study, lead Liviu Giosan is indeed a welcome note. Giosan and his team studied the fluvial landscape of the Indus and Ganga-Jamuna basins and tied it up with the changing intensity of the monsoon rains. They outright dismiss the speculation of the Ghaggar-Hakra as being combinely fed by the Himalayan melting snow (through Jamuna) and rainwater (Siwalik watershed) and emptying this flow to the Arabian Sea. Among other conclusions, their report concludes:

"Numerous speculations have advanced the idea that the Ghaggar-Hakra fluvial system, at times identified with the lost mythical river of Sarasvati, was a large glacier-fed Himalayan river. Potential sources for this river include the Yamuna River, the Sutlej River, or both rivers. However, the lack of large-scale incision on the interfluve demonstrates that large, glacier-fed rivers did not flow across the Ghaggar-Hakra region during the Holocene. Existing chronologies and our own age on the bank of Sutlej identified deposits of Late Pleistocene age, indicating that the interfluve formed instead during the last glacial period. Provenance detection suggests that the Yamuna may have contributed sediment to this region that seasonal monsoon flows intensified episodically during the late Holocene and may provide an explanation for the high concentration of medieval fortified sites in this region" (22).

THE ENVIRONMENT

Documenting the Environment of Today: The varied and diverse landscapes of the regions in which the Harapans and their predecessors settled have been subject to several types of environmental changes over the millennia. The following account deals with these changes, identifying and describing some of the environmental dynamics that were underway during Harappan times. Our discussion first previews the climate today in conjunction with varied geographical landscapes. This provides a basic orientation to the principal physical features visible on present-day maps of the region, current rainfall patterns, and general environmental conditions. The subsequent sections of the chapter describe changes that occurred between 10,000 and 2,000 years ago, the periods most relevant to the settlement in the region and to the Indus Civilization as a whole. Finally, we examine the climate and environmental changes in a broader framework inclusive of the Harappan's response to these changes. As we proceed, we emphasize some of the factors to consider in assessing the differences in landscape and climate between different geographical and cultural regions and between the Indus Valley and the peninsular India which has been so far a center of attention of most scholars working in South Asia.

A number of archaeologists and climatologists have attempted to reveal these processes in recent years. These studies not only provide new views of stability and change in the region's environmental setting, but are becoming the basis for developing some fresh ideas about the impact of these changes on the Harappan lives and settlement history. This is certainly going beyond the endless discussion on the pattern of monsoons which is a focal point of many of these descriptions but practically has little relevance to the situation in Pakistan.

With this caveat in mind, the importance of monsoons is nevertheless cannot be ignored for Pakistan, whether in Baluchistan and Sindh or other regions in the north. Their impact is, however, different in different areas. In Baluchistan, the monsoon precipitation belt is confined to parts of Kachi and the

Las Bela area. Overall, monsoon rainfalls are considerably less in Pakistan than that in India generally but, as meager as they are, they are crucial for sustaining life in the Greater Indus Valley as a whole. The present climate of the Greater Indus Valley, indeed that of South Asia generally, is variable due to differences in topography, air circulation patterns, and cyclic shifts in monsoon and winter rainfall. Coordinating subsistence activities with the timing of these environmental factors is critical to the successful cultivation of plants and raising of animals.

Under current conditions, the entire region is affected to some degree by seasonal temperatures and precipitation brought about by summer monsoons and winter westerlies. Monsoons are the result of the buildup of low pressure during winter that continues as the landmass begins to heat up, especially during April, May, and June. The thermal contrast between ocean waters and land area draws in trade winds from the sea that blow in a northeasterly direction. Moisture-filled winds release heavy rains along the peninsular coast and the Western Ghats of India, as far north as the slopes of the Himalayas, where they are deflected westward to the northern Punjab.

Rains continue from mid-June to September. Their most dramatic effects depend upon the intensity of the monsoons. In Gujarat, for example, 250 to 500 millimeters of rainfall can occur in a single day. At other times, when the monsoons are less intense, the same region can be subjected to severe drought (2). On the Gangetic plains, summer monsoon rains provide an abundance of precipitation, whereas in the Upper and Lower Indus rainfall is much lower (less than 200 to 700 millimeters, and 100 to 300 millimeters, respectively).

A separate and distinct source of rainfall is the westerly winter rains associated with storms originating in the Mediterranean that pass through the Middle East and along the southern coasts of Baluchistan. They terminate in the northwest of Pakistan. These winter rains have been a lifeblood of the Indus Age, as they were for the emergence of wheat-barley agriculture in the Middle East at the onset of the Holocene. Although a lot of research work has been done on winter rains in the Near East and western Iran, not much is available from Pakistan or the Iranian Plateau in general.

Taking both of these sources into account, different levels and seasons of rainfall, combined with the physical geography of the land, create varied environment in different parts of the Greater Indus Valley. These variations in environment are largely localized. The Indus cultures flourished in a vast tract of the land which ranges from coastal to northern plains and uplands extending into the subHimalayan region on one hand and from the high Iranian plateau to the Great Indian Desert, the Thar, on the other. Within this area today there are patches of wet mountains within largely a desert expanse. The rainfall pattern is much varied from largely winter rains in the southwest to largely summer monsoons in the north.

Climate Changes Before, During and After Peak Periods of Settlement: A number of scholars have discussed the problem of climatic changes in the greater Indus Valley during the third and second millennium BC. However, there has been little in the form of concrete and coherent thesis. Two related questions are generally asked: Did a similar pattern of rainfall exist during the entire Harappan period and was the climate pattern similar to that witnessed today. These questions have been a matter of serious enquiry since the first site was excavated in the Greater Indus Valley. A particular point of interest has been the weather during the beginning of the urbanization (the Early Harappan) in the fourth millennium BC and during the decline of the Harappan Civilization (the Late Harappan) in the beginning of 2nd millennium BC. Here two schools of thought have formed; one

supports a comparatively wetter climate during the rise and duration of the Harappan Civilization and a comparatively dry climate during its decay, while the other does not see much convincing evidence for it. The adherents of this opinion point to several geological indications to the fact that the climate of the Indus Valley has been the same for the last 10,000 years as we experience it today. The debate over the years has offered strong, though refutable, arguments for and against each position but, as shown subsequently, the weight of the evidence is clearly for a variable climate.

Taking the side of the position for a wetter climate in the formative stage of the Harappan Civilization, it is hard to deny the fact that the Harappan stage was in many ways very different, particularly in geographical expansion, art, architecture, technology, etc. from its antecedents and the postHarappan cultures. This would not have been possible without a favorable environment, which is believed to have been appreciably wet. The basis of any urban civilization is, of course, the 'surplus'. Hungry people do not create civilizations. Conversely, the decline of Harappan Civilization can be attributable to the onset of an unfavorable climate.

The evidence offered for such a position includes the presence of laboriously constructed dams of early antiquity in south Baluchistan called *gabarbands* which could only have been used if rainfall was substantially heavier; and the use of burnt instead of sun-dried bricks at Mohenjodaro, Harappa, and some other places in the construction of buildings. Furthermore, the animals of hot wet climate have been profusely depicted on the Indus seals; these include elephant, crocodile, and water buffalo. One of the latest is the discovery of bones of the rhinoceros in a hollow near a large Harappan brick structure at Nausharo in the arid Kacchi plain.

The pollen count studies of Gurdip Singh and coworkers in Rajasthan salt lakes were a major project in deciphering the past climate, especially the rainfall, in the Indus region (23,24,25). Singh et al. proposed that the increase in water salinity in these lakes was due to increased aridity in this region and that these data can be used to elucidate the climatic change in the Indus Valley.The results pointed to the three phases of the Holocene climate: (a) arid up to 5510 BC; (b) wet, from 5510 to 2230 BC; and (c) arid again, thereafter. These dry/wet/dry periods were then correlated with the formation, sustenance, and the end of the Harappan Civilization.

Singh's conclusion, however, came under attack from several different sources. For example, Possehl wrote:

" The changing salinity of these lakes, which appears to be well documented, need not be due to changes in rainfall. The geology and environment of Rajasthan are coupled. The three lakes investigated are hypersaline today, but there are also freshwater lakes in this same region (Lakes Pushkar and Ganger). This observation leads to the conclusion that, under one climatic regime in Rajasthan, there can be both freshwater and hypersaline lakes, calling into question the Singh hypothesis". And, "Site counts go up from 218 during the Mature Harappan to 853 in Post-urban times, Although there was a dramatic drop in average site size, down from 13.54 to 3.55 ha, the estimated total settled area remained remarkably stable for both periods. These data do not look like those that one would expect if there had been a severe reduction in rainfall as Singh proposed, especially given the fact that it is a dry cropping region" (1).

Possehl also noted that the radiocarbon dates were not sufficiently numerous to form a firm basis for such a chronology though he accepted the sequence of the three phases. Furthermore, when Gurdip Singh's procedure was followed in the salt basins of Pachpadra and Thob in Rajasthan, the pollen

analysis did not disclose such a sharp drywet-and-dry sequence. It rather indicated evidence of such changes as could simply result from erratic rainfall characteristics of desert terrains.

Some other archaeologists also weighed in. For instance, Misra concluded "In sum, the enormous volume of archaeological evidence now available from northwest India [Pakistan] completely fails to sustain the overall hypothesis proposed by Gurdip Singh that fluctuations in rainfall played a decisive role in the emergence, diffusion, prosperity and decline of farming-based cultures in the region. The only role the increased rainfall played was to arrest the hyperaridity of the Upper Pleistocene, stabilize the sand dunes, accelerate the growth of vegetation and help in the emergence and spread of a nomadic hunting-gathering-pastoral economy. This pattern of life has persisted in the semi-arid and arid environments to this day" (26).

The next substantial work was that of Enzel *et al.* (13). Based on the limnology of the dry Lunkaransar lake in Rajasthan, they argue that this region experienced wet climate between 6300 and 4800 BC. A study based on sediment samples from different micro-environments from the GhaggarHakra River area documented severe oscillations in precipitation. These oscillations began 10,500 years ago when precipitation was abundant. A change occurred around 5,000 years ago, that is around 3,000 BC. when there was decreased precipitation and increased aridity, suggesting that the peak period of Indus settlement took place during a dry period instead of during a relatively wet one.

Both these teams worked in Rajasthan but the explanation given for the timing and factors for the desiccation of the lakes and its correlation with archaeological data led to different interpretations. The first group, leat by Gurdeep Singh, proposed good climatic conditions during the flourishing Harappan phase, whereas the latter group, lead by Enzel, proposed that the Harappan Civilization flourished when the climatic conditions (measured in terms of rainfall) were not very conducive for the human cultures.

Bryson and Swain (27) opined that until 6,000 years ago (roughly 4000 B.C.) vegetation in the region was more abundant than today due to wetter conditions. The major settlements at that time were not on the alluvial plain but at its margins in the mountain valleys and their foothills of Baluchistan at places like Mehrgarh. After 4000 BC., the monsoons declined but the wet phase continued as a result of "higher precipitation efficiency" involving winter rains. It was under these conditions that larger numbers of people began to move to the alluvial plains of the Indus Valley and the GhaggarHakra plains.

Later scientists argued that to divide the climate of the Indus Civilization into wet and dry periods is too simplistic. First of all a generalization of wetter or dryer, cannot be made in the case of the Greater Indus Valley as a whole. Secondly, in each region the climate was much more variable than hithertofore assumed. Climatically, the Indus Valley was a truly dynamic environment in the entire Holocene. In partial support of this paradigm of instability, evidence from marine cores taken off the coast of southern Pakistan (12) was offered. Analysis of this evidence (based on the relative thickness of continentally derived monsoon deposits) showed fluctuations in precipitation with peaks of monsoon intensity until ca. 2000-1750 B.C. after which precipitation was at its minimum. Von Rad (12) believed that this aridification affected a broad region that included the Middle East and North Africa, which led to the reduction of Nile River discharge and abandonment of sites in Syria.

What do we make of these studies? Probably not much. What makes these studies problematic are the disagreements in the timing of the major fluctuations in rainfall. Mandella and Fuller attempted to

partially resolve these problems by recalibration of many of the chronological dates and reconstructed the following pattern (15): Sometime around 12500 and 8500 B.C. there was a period of higher rainfall, but one marked by fluctuating arid spells. By 8500 to 7000 B.C. rainfall levels were high but were interspersed with arid periods. The pattern continued until 5200 B.C. but with more frequent and severe periods of aridity. Beginning sometime around 3950-3700 B.C., there was an increased drying trend. Although monsoon rains

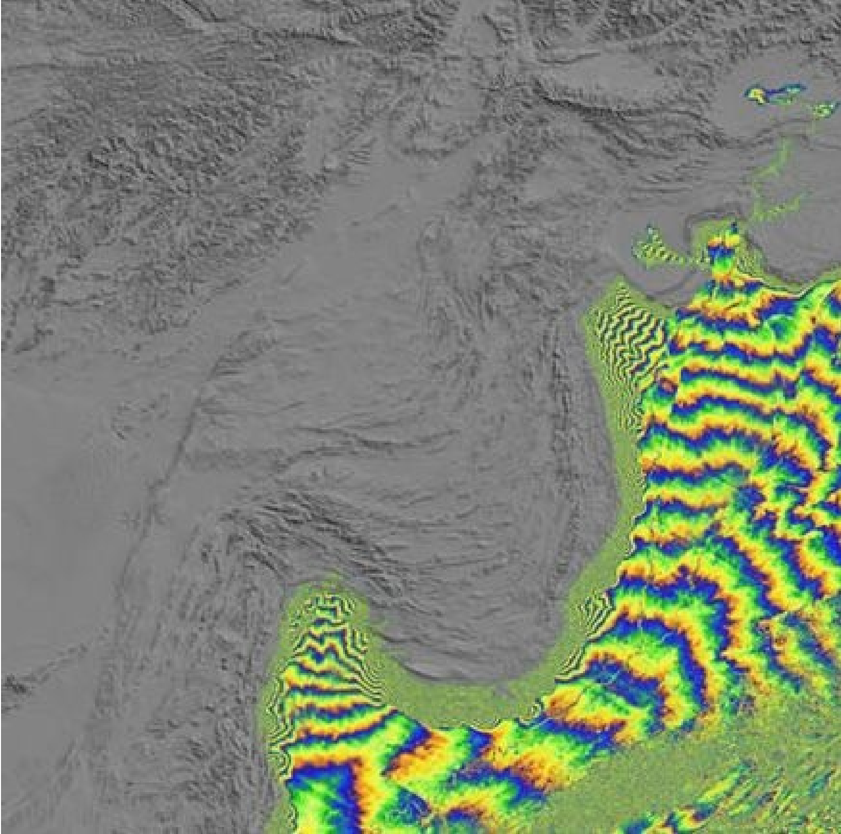
were reduced, there were consistently high levels of winter rains. After 2800 B.C., rainfall levels declined bringing about "modern levels of aridity" (15). According to this reconstruction, the periods of high precipitation occurred before full-scale urbanism, which Madella and Fuller suggest would have resulted in increasing agricultural surpluses among communities in the pre-urban period. These surpluses may have influenced the spread of settlements onto the alluvial plain (15). By 2200 B.C., they followed others in suggesting that a significant drying trend had occurred.

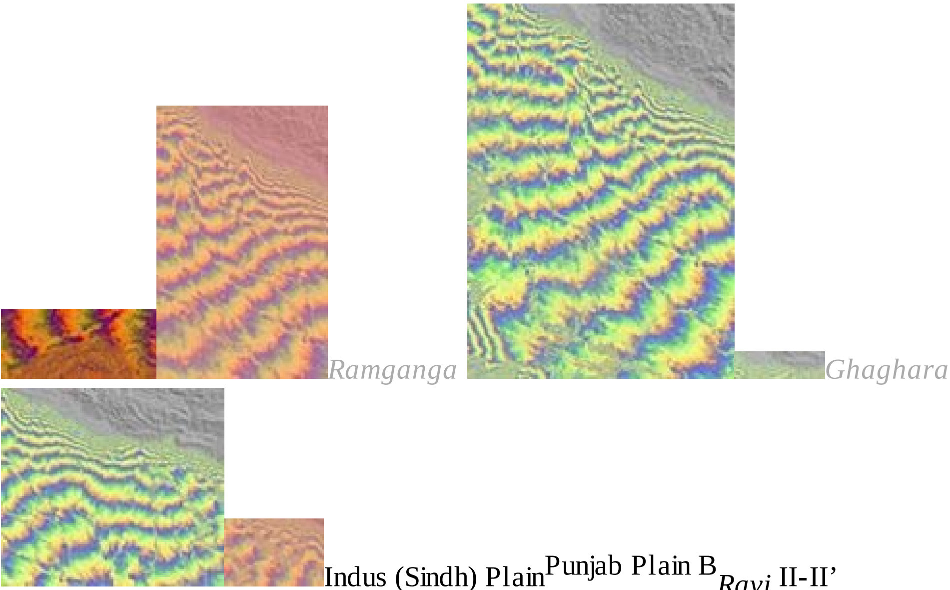
There are those who believe that, barring some minor fluctuations, the Indus climate has been as it is today. They generally discount the pollen studies referred to above in favor of substantially wetter periods or drastically dryer periods of the Indus climate. At the same time, they offer the charcoal studies that have been recently conducted in a number of areas of Baluchistan and Sindh. These studies have shown that the inhabitants of Baluchistan over a long period of time have used the same vegetation as is present today, thus indicating a similar climate.

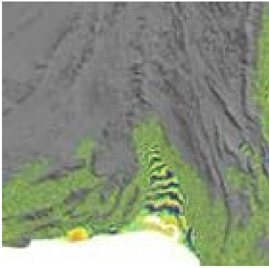
Contrary to the general belief in the dry/wet/ dry climatic scenario, discussed above, the paleo

These arguments in favor of the constancy of climate (on the side of a dry climate, to be sure) during the beginning, flourishing, and decay of the Harappan Civilization are quite convincing but it does leave several loopholes to be plugged. How does one explain the obvious prosperity of Baluchistan, now utterly desolate and miserably poor in subsistence resources? Even in the thirteenth century A.D. the Mughal emperor Babur offers the chief reason for invading Baluchistan for it being “rich” and “prosperous” in crops as well as in sheep, goats, and cattle. And how does one reconcile the description of the southern Punjab by Ibn-e-Batuta in the fourteenth century A.D. as being thickly forested and infested with animals which we normally associate with tropical jungle, such as elephants and rhinoceros? What happened that the area in question is now a vast desert, if not a change in climate? Are these events due to human interference and mismanagement of natural resources, or have there been changes in precipitation and temperature in the centuries preceding the present? No records of such changes in climate are available but nor are any satisfactory explanations of events which do point to a change in climate.

Recent Studies: The above results are con

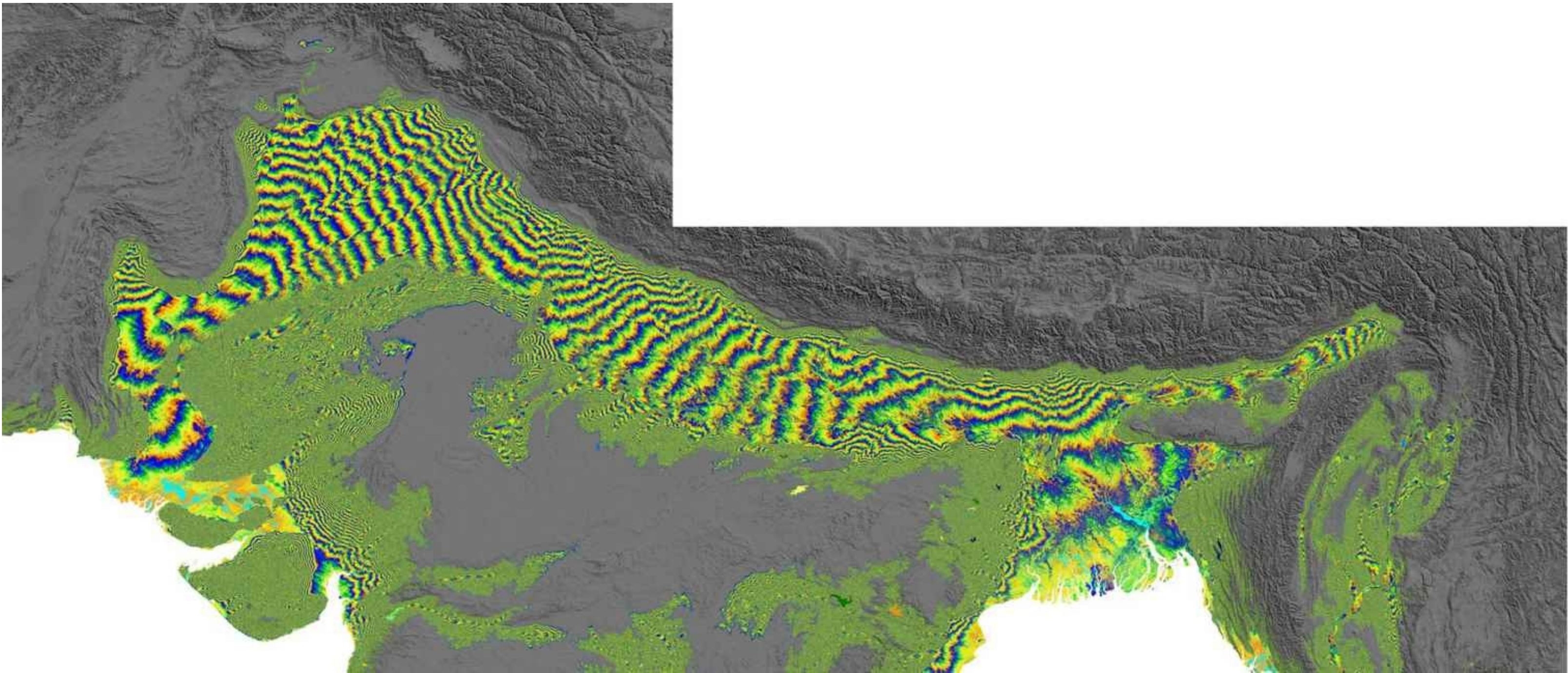

Indus

150 JhelumChenab 100
Togarh
Range
III
Sulaiman
Range

Ramganga
Ghaghara
Indus (Sindh) Plain
Punjab Plain B
Ravi II-II'
Brahui III' Range

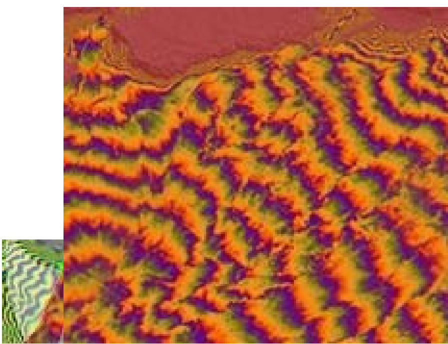


Thar Desert II’

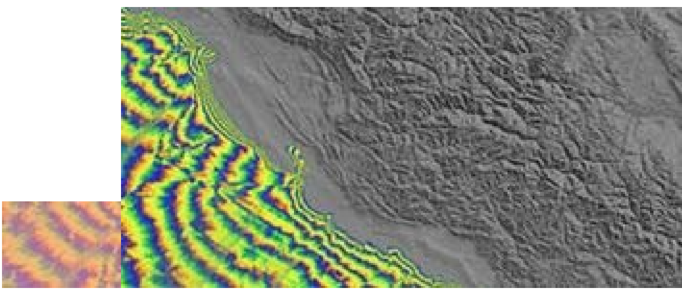
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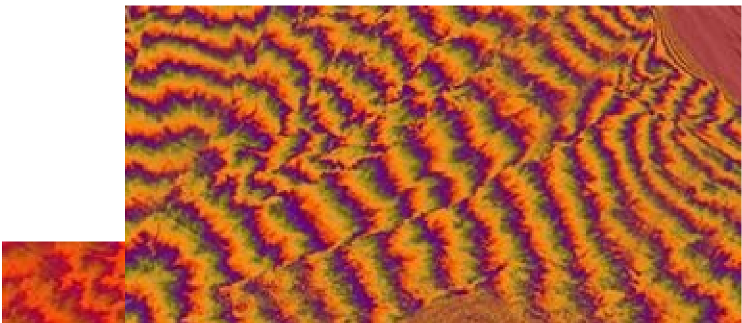
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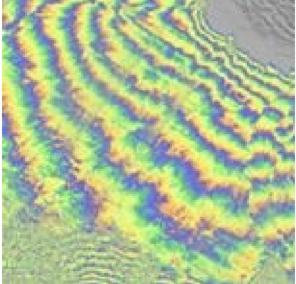
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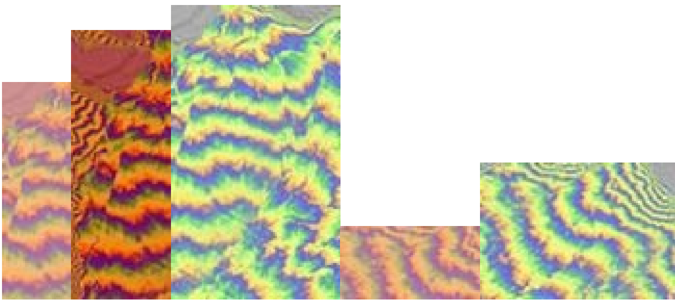


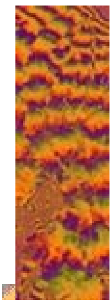
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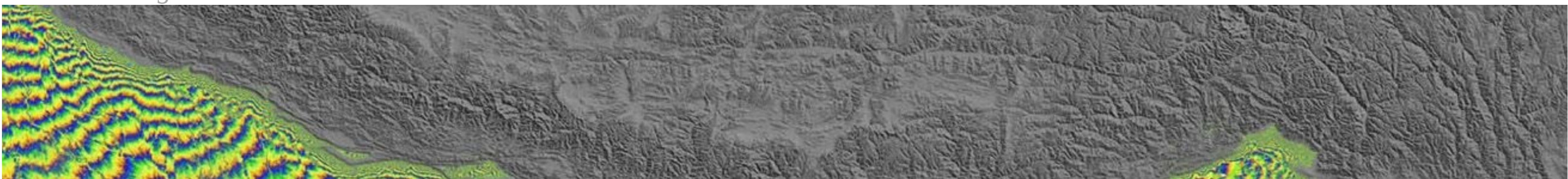


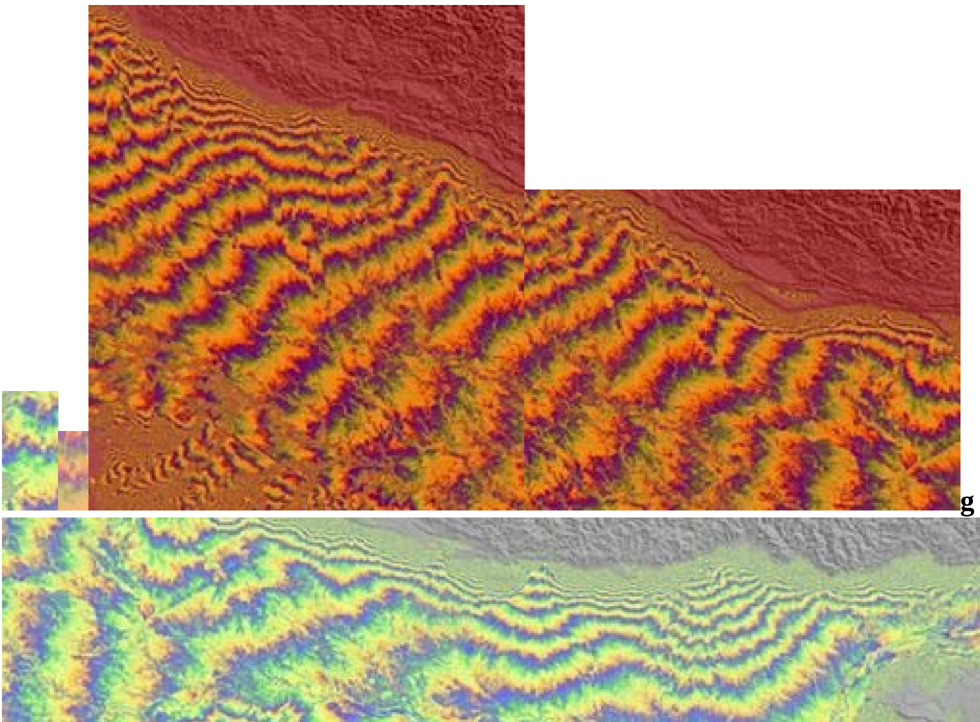
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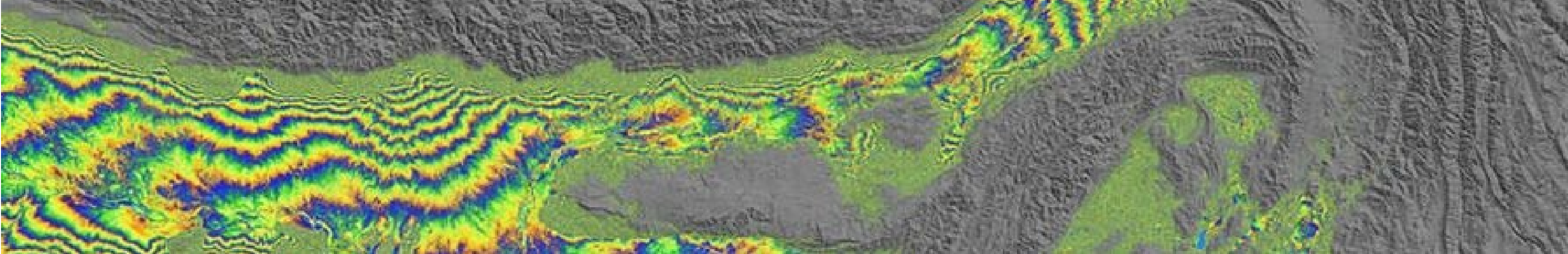

Yamuna
IV


Ravi Himalayas I-I' *Indus* III-III' IV-IV'


Ganga

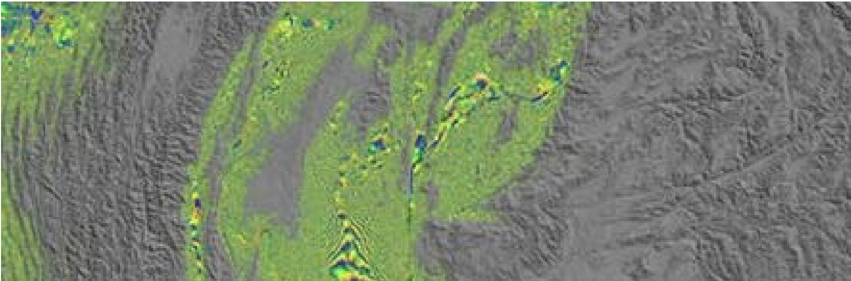

IV'


g



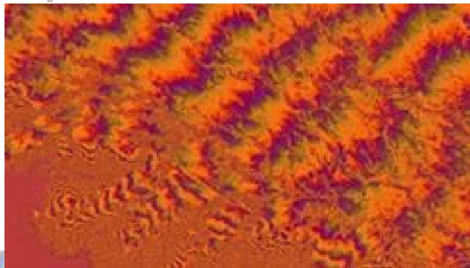
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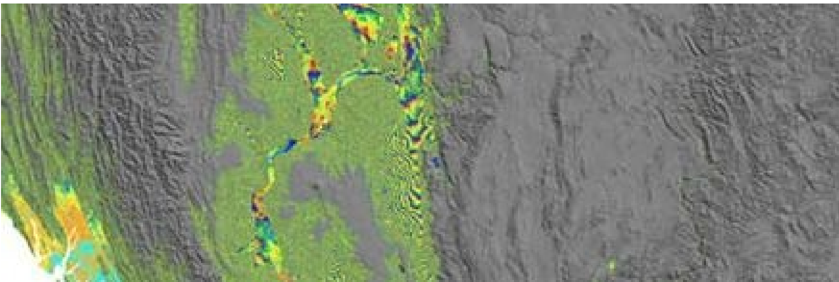

C

1,000 *Indus*

Himalayas


k

700
600
500 *Panjnad*



J MM S N Month

20
10
0

Indus Jhelum

Large-scale morphology of the Indus and Ganga Plains . Convex downslope, aggradational landscapes have a lighter D 30 2.3

Indus 2.8 Chenab 3.9 200

2.1 2.6 **mask, whereas incisional landscapes have a red mask. (B) Along-channel longitudinal profiles for the Indus and its Pun** 10.0 10.4 20 120 3.6

jab tributaries. (C) Hydrographs for the Indus and confluent Punjab tributaries (Panjnad River). 0.8 180 10 110 Profile I-I’ (150 km) Profile II-II’ (130 km) Profile III-III’ (205 km) 100 climatic research of Enzel et al (13) have shown Indus (Sindh) Plain

Profile IV-IV’ (420 km) 160

fusing, to say the least, but the belief in "wetter" cliPunjab Plain
that the Thar had started to become arid by 4800 mate in the Harappan formatic period and "dryer"
BC,**Fig. 1.**more than a millennium before the Early climateLarge-scale morphology of the Indo-Gangetic Plain (for altitudes, pattern of colors repeats every 10 m to 300 m in height; higher landscape in gray).in the period of decline still
persists. This is Harappan phase (3300–2600 BC). This suggests ¼ *t*;Kosi¼ *k* ;Gandak¼largely an intuitive
reading of the various studies (*B*) Along-channel longitudinal profiles for the Indus and its Punjab tributaries. (*C*) Hydrographs for the Indus and confluent Punjab tributaries (Panjnad River).that Harappan culture must have risen and fallen in

(*D*
semi-arid climatic conditions similar to the presentfluvial sedimentary deposits in Sindh and Punjab (ages in thousands of years).
day. Ghaggar-Hakra may have been a powerful hy
tion to understand how climate-controlled changes in river dy
drological body when aridity had not set in the
namics affected the Harappans (*SI Text*).
greater Indus Valley (i.e. before 4800 BC), but much
before the emergence of the Harappan Civilization.
The Indo-Gangetic Plain (Fig. 1) was built during the Cenozoic89with sediments derived primarily from the Himalayas (23). Our

digital elevation model shows a trend from aggradation in the
eastern part of the Indo-Gangetic Plain toward incising rivers
in the west (24), probably driven by the westward weakening of

the monsoonal rains along the Himalayas (9, 25). In the eastern
conducted so far rather than a conclusion drawn) Profiles across the extended Indus plain (in meters above sea level). River channel locations are identified on the profiles, as are locations and ages of studiedfrom scientific investigations. The fault probably lies
on the assumed interrelation between the rainfall
of the Sutlej River (12), the easternmost tributary of the Indus,
and the agricultural production - more rain, more

century-long phases of sediment load decline caused by weak production and more settlements; less rain, less
monsoons were responsible for incision, primarily in the early prosperity, less population - rather than questing the

Holocene between approximately 10;000 and 8,700 y ago. The

presence of Harappan and even earlier settlements within these incised valleys (*vide infra*) also argues for major incision predating the Harappan. During Harappan times, the alluvial landscape in Punjab offered suitable terrain for floodwater farming within incised valleys and important protection against large floods

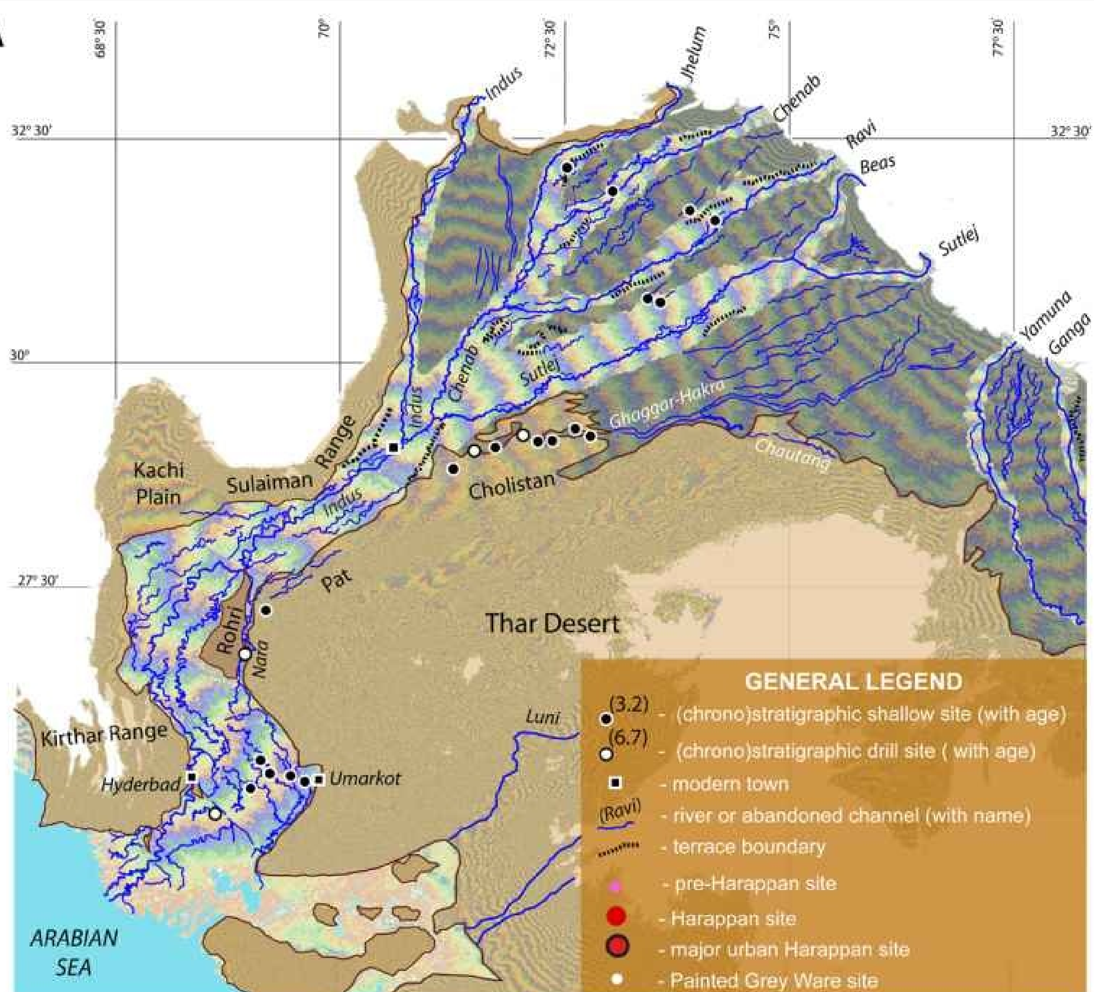
basic paradigm. The fact is that for the arid Indus region, river floods have always been far more important and reliable for agriculture than rainfall (28) and inundation agriculture during the *rabi* season (winter crops) was dominant along the Indus and its tributaries (29).

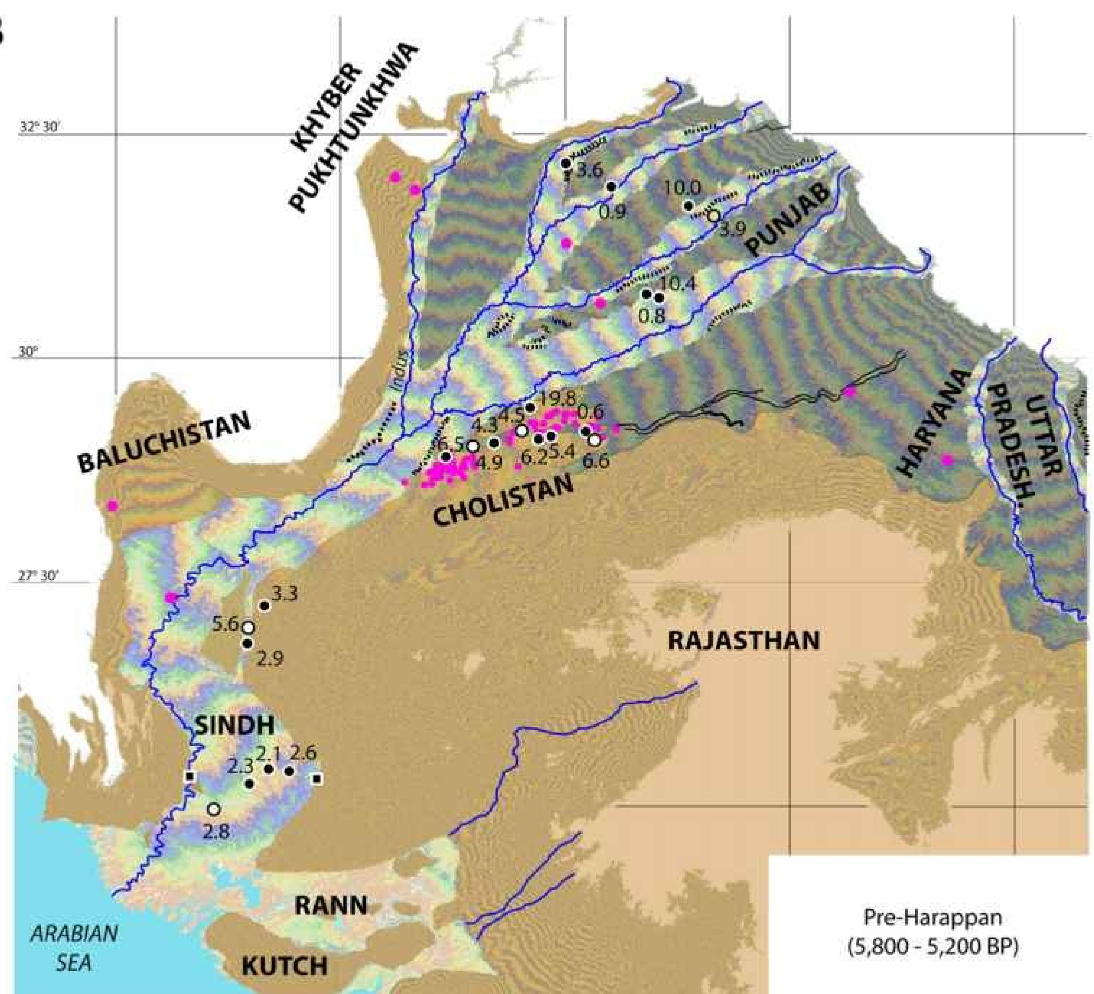
This paradigm has recently been given substance in an extensive study by Giosan et al (22), discussed

below. The underlying idea is that the rainfall is indeed a part of environment and most regions of the world depend on rain water for their subsistence. But it is not the whole story. Egypt's agriculture never depended on the amount of the rainfall but the amount of water in the Nile and its flooding. Similarly, we know that the agriculture potential of the Greater Indus Valley was only marginally depended on the monsoon. Particularly, the Indus people first began to produce their large agribecame impossible, forcing the populace to move elsewhere and bringing the civilization to an end.

This is a large-scale, multi-disciplinary research, conducted between 2003 and 2008 from the coast of the Arabian Sea into the fertile irrigated valleys of Punjab and the northern Thar Desert. The international team included scientists from the U.S., U.K., Pakistan, India, and Romania with specialties in geology, geomorphology, archaeology, and mathematics. By combining satellite photos and topographic data collected by the Shuttle Radar Topography Mission (SRTM), the researchers prepared and analyzed digital maps of landforms constructed by the Indus and neighboring rivers, which were then probed in the field by drilling, coring, and even manually-dug trenches. were used to determine the whether brought in and shaped by rivers or wind, Collected samples sediments' origins,

cultural surplus only when they settled along the rivers which regularly inundated and over flowed their banks, providing the needed moisture for the growing of crops and grazing of animals. In other words, the Harappans did not de pend on rain water for their subsistent but on the river waters that became available to them regularly through inundation. It is the availabil ity of this water that was criti cal in the formative period of the civilization and it was the lack of it in the period of de cline. The interrelation tween the rainfall and be the


A
68° 30'
70°
72° 30'
75°
77° 30'
32° 30'
30°
27° 30'
Indus
Jhelum
Chenab
Ravi
Beas
Sutlej
Yamuna
Ganga
Chenab
Sutlej
Indus
Ghaggar-Hakra
Chautang
Kachi Plain
Sulaiman Range
Indus
Cholistan
Pat
Rohri
Nara
Thar Desert
Kirthar Range
Hyderbad
Umarkot
Luni
ARABIAN SEA
GENERAL LEGEND
(3.2) - (chrono)stratigraphic shallow site (with age)
(6.7) - (chrono)stratigraphic drill site (with age)
- modern town
(Ravi) - river or abandoned channel (with name)
- terrace boundary
- pre-Harappan site
- Harappan site
- major urban Harappan site
- Painted Grey Ware site


B
32° 30'
30°
27° 30'
KHYBER PUKHTUNKHWA
PUNJAB
BALUCHISTAN
Indus
CHOLISTAN
HARYANA
UTTAR PRADESH.
RAJASTHAN
SINDH
RANN
KUTCH
ARABIAN SEA
3.6
0.9
10.0
3.9
10.4
0.8
19.8
0.6
4.5
4.3
6.5
4.9
6.2
5.4
6.6
3.3
5.6
2.9
2.3
2.1
2.6
2.8
Pre-Harappan
(5,800 - 5,200 BP)

agricultural production - more rain, more production and more settlements; less rain, less prosperity, less population - does not strictly hold.

Based on O^{18} isotopes the researchers reject the oft quoted dry/wet/dry scenario of Gurdip Singh et al and agree with Enzel et al who

suggest that Thar had started **Fluvial and inter-fluvial features of the Indus valley and the Indo-Gangetic Divide** to become arid by 4800 BC

(13), more than a millennium *Giosan et. al* before the Early Harappan phase (3300–2600 BC) and that the Harappan Civilization arose and fell during a semi-arid climatic conditions similar to the present day. There was no particularly wet interval of substantial duration in between. This decline in rainfall contributed to a decrease in massive floodings in the rivers, allowing the Harappan civilization to emerge as the flooding hit just the "right level" for agriculture by inundation. As aridity intensified, monsoon-augmented floods became even less frequent and/or less intense to the point that a large scale subsistence and their age, in order to develop a chronology of landscape changes. The study was conducted under the sponsorship of Wood Hole Oceanographic Institute, and reported by Giosan and coworkers in PNSA (22). We summarize the results of this expansive study in the followings

During the early Holocene, that is prior to 10,000 years ago, the wild and forceful Indus and its tributaries flowing from the Himalaya cut valleys into their own deposits and left high "interfluvial" stretches of land between them - locally called the

bars. However, the evidence indicates that after about 5,000-6,000 years ago, as rainfall decreased and aridification intensified in the region, the fluvial landscapes in Harappan territory became remarkably stable. Upstream on the alluvial plain, the large Himalayan rivers in Punjab stopped incising, while down-stream, sedimentation slowed on the distinctive mega-fluvial ridge, which the Indus built in Sindh. This fluvial quiescence suggests a gradual decrease in flood intensity that probably stimulated intensive agriculture initially and encouraged urbanization in the Indus plains around 2,500 BC. The archaeological and geological data shows that

settlements bloomed along the Indus from the coast to the hills fronting the Himalayas as weakened monsoons and reduced run-off from the mountains

Fig. 2. (*A*) Morphology of the western Indo-Gangetamed the wild Indus and its Himalayan tributaries
tic plain with interfluves (in gray mask), incised

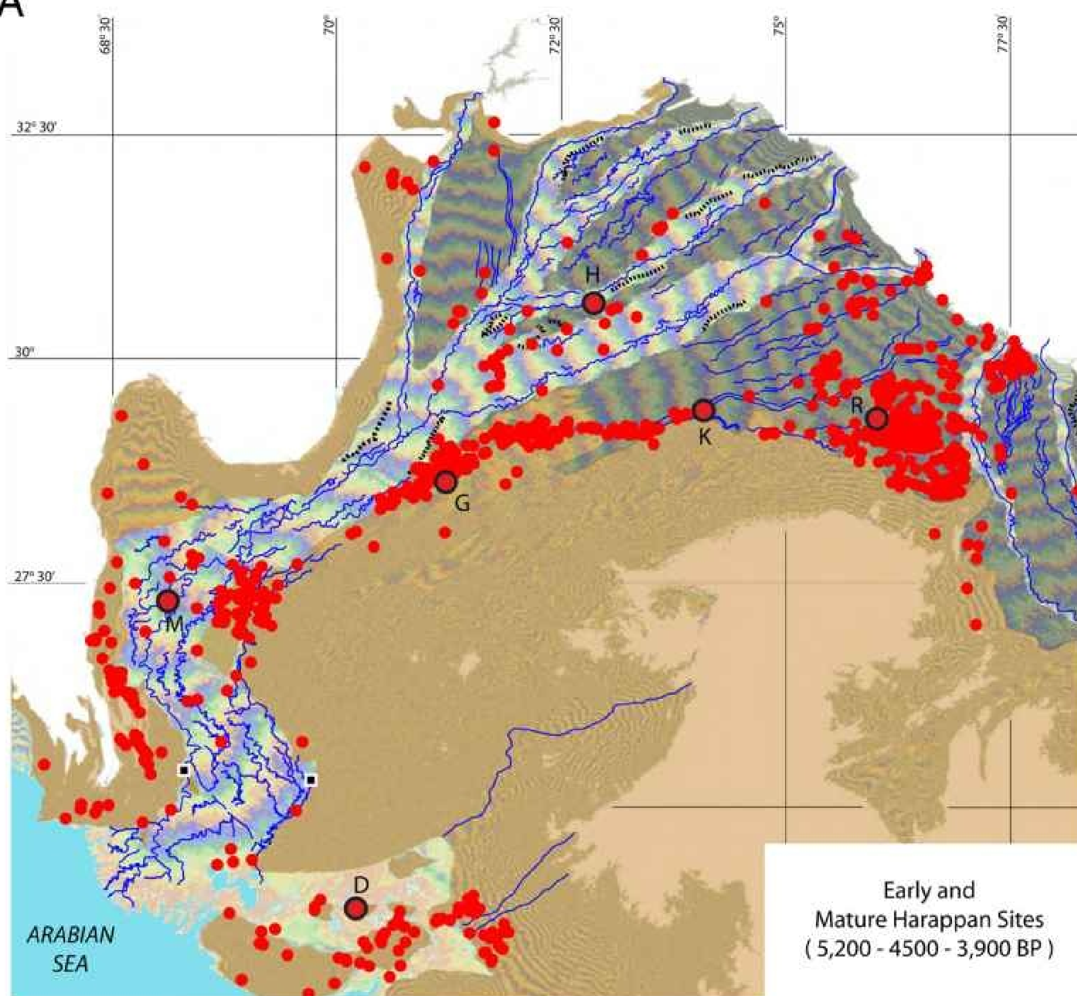
enough to enable agriculture along their banks. lines), and active and fossilized river channels (inThis lasted for almost 2,000 years, but fur
blue). Legend further indicates sampling locations

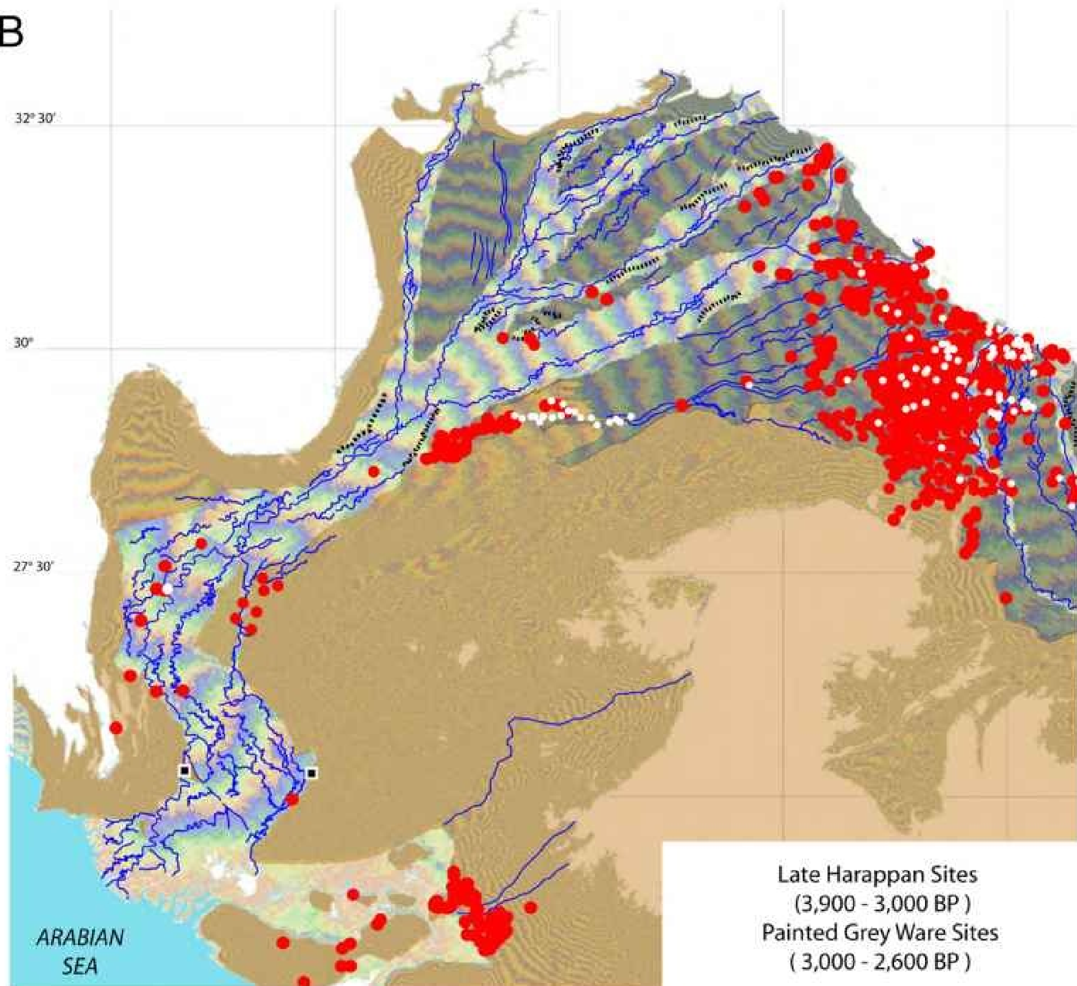
ther decline in monsoon precipitation led to conditions adverse to both inundation and rain-based farming.

fluvial deposits at all sites), and selected town names.
By 2,000 BC, their rivers drying, the during the last glacial period, but switched to the Ganges basin the end of the Late Harappan Phase, as recent as 2,900 y agoHarappans started to experience economic stress
before Harappan times. (33) (Fig. 2*B*). This widespread fluvial redistribution of sediment
The present Ghaggar-Hakra valley and its tributary rivers are
suggests
that
which increased by the passing day. The agricul

reliable monsoon rains were able to sustain currently dry or have seasonal flows. Yet rivers were undoubtedly perennial rivers earlier during the Holocene and explains whytural surplus being severely reduced, the urban cenactive in this region during the Urban Harappan Phase. We reHarappan ters could not be maintained anymore. The Harapcovered sandy fluvial deposits approximately 5;400 y old at Fort Hakra system without access to a glacier-fed river (5, Fig. 3

Abbas in Pakistan (
SI Text
), and recent work (33) on the upper
pans had the choice to move or perish. They had an
Similar, strictly monsoonal rivers maintaining a groundwaterGhaggar-Hakra interfluve in India also documented Holocene
escape route to the east toward the Indo-Gangetic fed base flow are now active only on the more humid Ganga basin channel sands that are approximately 4;300 y old. On the upper (34). We also document renewed fluvial deposition on the lowerDivide, where monsoon rains remained reliable. interfluve, fine-grained floodplain deposition continued until Ghaggar-Hakra system approximately“We can envision that this eastern shift in
volved a change to more localized forms of econ
Giosan et al.


A
68° 30'
70°
72° 30'
75°
77° 30'
32° 30'
30°
27° 30'
H
K
R
G
M
D
ARABIAN SEA
Early and Mature Harappan Sites (5,200 - 4500 - 3,900 BP)

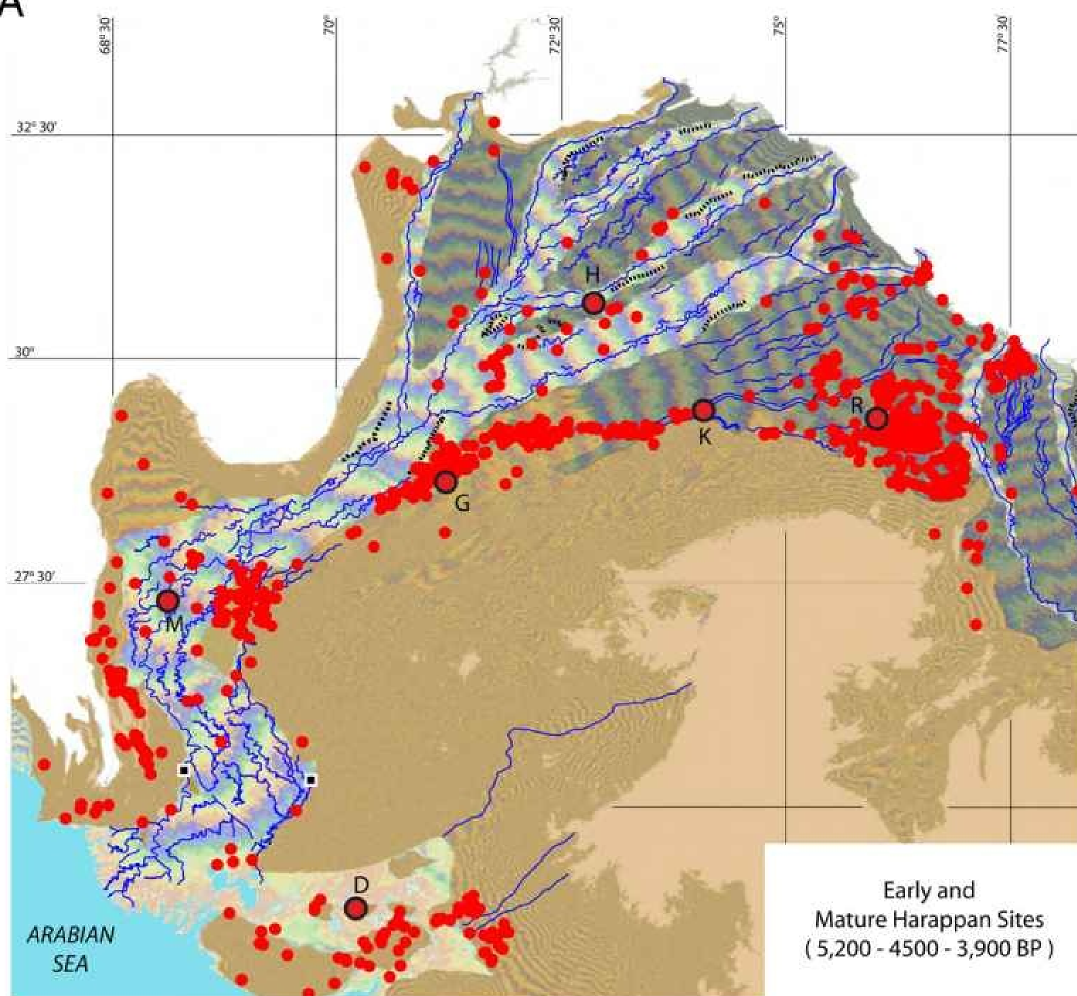

B
32° 30'
30°
27° 30'
ARABIAN SEA
Late Harappan Sites (3,900 - 3,000 BP)
Painted Grey Ware Sites (3,000 - 2,600 BP)

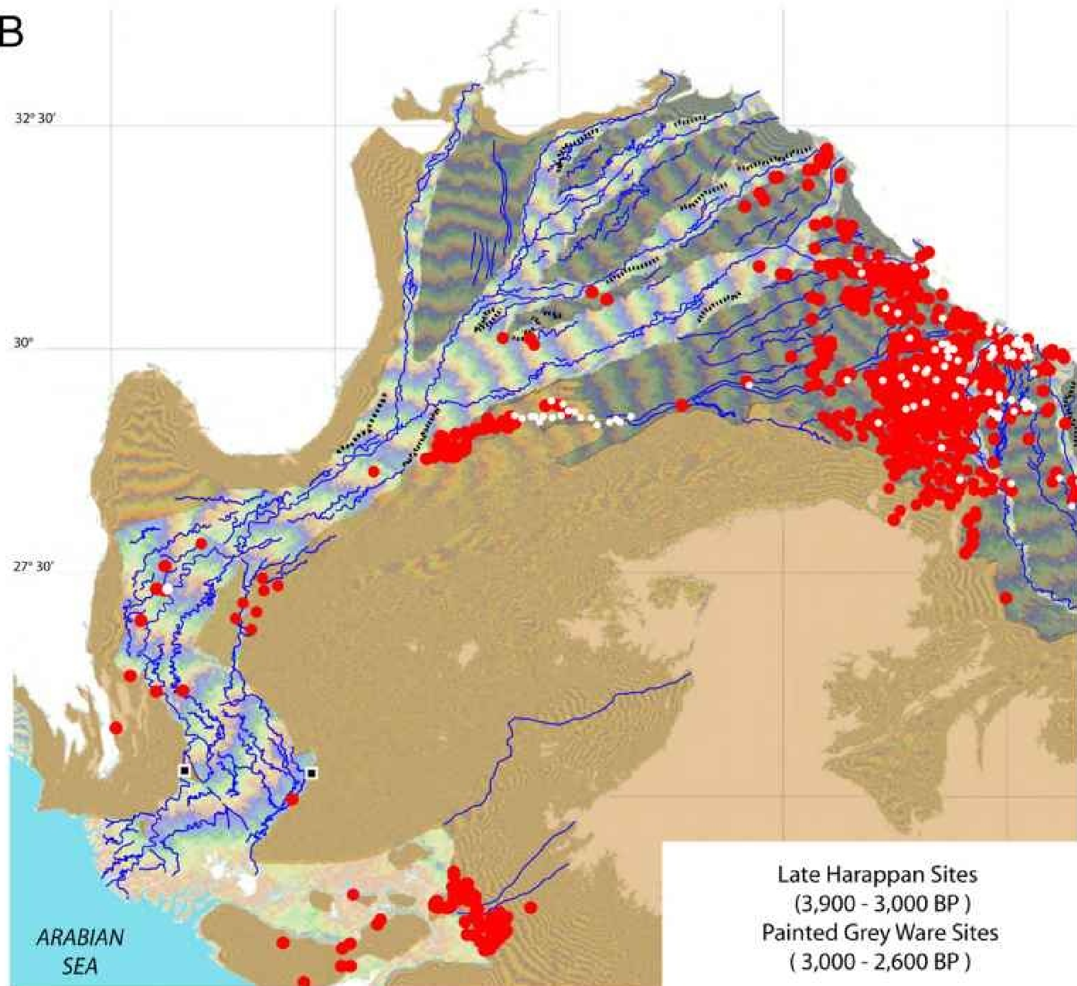
Chronological changes in settlement density in the Indus Valley:
Top: Pre-Harappan Neolithic Settlements
Middle: Early and Mature Harappan Com

omy: smaller communities supported by local rainfed farming and dwindling streams," said Fuller, one of the researchers. "This may have produced smaller surpluses, and would not have supported large cities, but would have been reliable." Such a system was not favorable for the Indus Civilization, which had been built on bumper crop surpluses along the Indus and the Ghaggar-Hakra river in the earlier wetter era. This dispersal of population meant that there was no longer a concentration of workforce to support urbanism." Thus cities collapsed, but smaller agricultural communities were sustainable and flourished. Many of the urban arts, such as writing, faded away, but agriculture continued and actually diversified," said Fuller.

In summary, the study showed that the slow eastern shift of the monsoons is what initially supported the civilization by encouraging agriculture, but as the monsoon shifted further east, it weakened the rain-fed rivers that were the lifeline of the civilization. It also drastically decreased the area of seasonal flooding along the snow-fed rivers, such

the western Indo-Gangetic plain (see Fig. 2 for color
as the Indus and its major tributaries. As the arable
land
Harappan sites, with names of some major urban
centers:
D
decreased,
¼ Dholavira;
agricultural production fell. *M* the Mohenjo-Daro; *G*
Ganweriwala; *H* ¼ Harappa; *K* ¼ Kalibangan; ¼ Rakhigarhi. (*B*) LateHarappan(red)andPaintedGray surplus that was needed for supporting that part of
the western Indo-Gangetic plain (see Fig. 2 for color
¼ This, in turn, diminished, or entirely eliminated, the
munities


A
68° 30'
70°
72° 30'
75°
77° 30'
32° 30'
30°
27° 30'
H
K
R
G
M
D
ARABIAN SEA
Early and Mature Harappan Sites (5,200 - 4500 - 3,900 BP)


B
32° 30'
30°
27° 30'
ARABIAN SEA
Late Harappan Sites (3,900 - 3,000 BP)
Painted Grey Ware Sites (3,000 - 2,600 BP)

the population that was not involved directly in agri
that seasonal monsoon flows intensified episodically during the 1,500 y old on the edge of the expanding Thar Desert have begun

Bottom: Late Harappan villages

late Holocene and may provide an explanation for the high conto cover this region of the interfluve, but sediment originating culture, which in turn led to diminished social com
centration of medieval fortified sites in this region (5).

(
)

plexity.
centers: *D* ¼ Dholavira; *M* ¼ Mohenjo-Daro; *G* from the Indus-Punjab system, the Ghaggar-Hakra, or from ¼

Farther to the south, the five Punjab tributaries of the Indus Ganweriwala; *H* Harappa; *K* ¼ Kalibangan; *R* ¼ both of these river systems was deposited as late as 4,250 y ago)LateHarappan(red)andPaintedGray merge to form the Panjnad River, before joining the Indus (Figs. 1 (Fig. 2*B*; *SI Text* Rakhigarhi. (Contrary to earlier assumptions that a large). Zircon dating of sand in this confluence region

and 2
A

). Incision (4
–
5 m deep) between the two confluences and

indicates inputs from both Beas and Sutlej drainage basins (32).Ware (white) sites.

glacier-fed Himalayan river, identified by some with further south along the greater Indus separates vertically the Continuing to the southwest on the Ghaggar-Hakra interfluve, we that seasonal monsoon flows intensified episodically during the 1,500 y old on the edge of the expanding Thar Desert have begun modern floodplain and the southernmost extension of the Ghagdocument well-watered lands in the region of Pat, where channels late Holocene and may provide an explanation for the high con
gar-Hakra interfluve in the Cholistan region. Dunes younger than

centration of medieval fortified sites in this region (5).
Farther to the south, the five Punjab tributaries of the Indus

merge to form the Panjnad River, before joining the Indus (Figs. 1 and 2*A*). Incision (4–5 m deep) between the two confluences and further south along the greater Indus separates vertically the
91
to cover this region of the interfluve, but sediment originating ran parallel with the Indus and joined the Nara valley; their fluvial from the Indus-Punjab system, the Ghaggar-Hakra, or from both of these river systems was deposited as late as 4,250 y ago

(Fig. 2
B
;
SI Text

). Zircon dating of sand in this confluence region indicates inputs from both Beas and Sutlej drainage basins (32).
Continuing to the southwest on the Ghaggar-Hakra interfluve, we

the mythical Sarasvati, watered the Harappan heartland on the interfluve between the Indus and Ganges basins, Giosan team showed that only monsoonal-fed river-braids, not the snow-fed rivers, were active there during the Holocene. As the monsoon weakened, these monsoonal rivers gradually dried or became seasonal, affecting habitability along their courses. Hydroclimatic stress increased the vulnerability of agricultural production supporting Harappan urbanism, leading to settlement downsizing, diversification of crops, and a drastic increase in settlements in the moister monsoon regions of the upper Punjab, northern Rajasthan, and Haryana. At the same time the size of all these settlements - old and new - substantially decreased.

The present Ghaggar-Hakra valley and its tributary rivers are currently dry or have seasonal flows. Yet rivers were undoubtedly active in this region during the Urban Harappan Phase. Giosan team recovered sandy fluvial deposits approximately 5,400 years old at Fort Abbas in Pakistan, and recent work (30) on the upper Ghaggar-Hakra interfluve in India also documented Holocene channel sands that are approximately 4,300 years old. On the upper interfluve, fine-grained floodplain deposition continued until the end of the Late Harappan Phase, as recent as 3,000 years ago (30). This widespread fluvial redistribution of sediment suggests that reliable monsoon rains were able to sustain perennial rivers during the Holocene and explains why Harappan settlements flourished along the entire Ghaggar-Hakra system without access to a glacier-fed river. However, the flow in these river-braids could not be maintained when the rainfalls shifted further east. Strictly monsoonal rivers maintaining a groundwater-fed base flow are now active only on the more humid Ganga basin. Giosan team also documented renewed fluvial deposition on the lower Ghaggar-Hakra system approximately 700 years ago, which indicates that seasonal monsoon flows intensified episodically during the late Holocene and may provide an explanation for the high concentration of medieval fortified sites in this region (31).

Settlements of the post-urban period are preferentially located near the easily flooded region at the confluence of the Indus with rivers in Punjab or in eastern regions with more reliable monsoon rains. Diversification of agriculture towards Kharif (summer) rain-based crops and the increase in drought-tolerant crops like millets at the end of the urban phase reveal intense efforts to adapt to hydroclimatic stress at the arid outer edge of the monsoonal rain belt.

Although snowmelt continued to regularly provide water to the Indus and its Himalayan tributaries, the Harappans did not develop canal irrigation. In contrast to inhabitants of Mesopotamia and Egypt, which were surrounded by arid lands, the Harappans had the option to migrate east toward more humid regions of the Indo-Gangetic Divide. Migration toward the periphery could have contributed to reduced population in the core region of the Harappan domain and the decline of urban centers.

The shifting of monsoons pattern towards the east and with it the depletion of agricultural resources in the west is emerging the most credible cause of the Harappan collapse and a general shift of population from west to east during the early second millennium BC.

To summarize, the continual shifting of monsoons to the east and the resulting decrease in the frequency and the extent of river floods in the west had put the Harappans in an unenviable position of depleting source of living, the food. As a response to this adverse situation on which they had but little control, the Harappans exercised a number of responses. First, they started to move to the areas that offered them better agricultural potential. These areas happened to be generally east of their erstwhile core region. The rainfall was somewhat better and the water streams flooded more

regularly. Second, they shifted their settlements to the areas near the confluence of the rivers in Punjab and Sindh and near numerous waterholes that were scattered along the erstwhile river beds. Third, they decreased the size of their settlements but increased their number and continued living along the rivers in the areas which still afforded substantial flooding for their agriculture. Fourth, and probably equally important, they took up the cultivation of summer crops, especially those that could be grown in relatively arid conditions - the millets, such as Jawar and Bajra - along with their traditional crops of barley and wheat.

Environmental Degradation: The presentday vegetation in Pakistan is the product of millennia of human activity and exploitation. Trees have been felled for timber, for use in constructing buildings and ships, for making furniture, tools, and other artifacts, or for fuel for domestic and industrial purposes. Forests have been cleared to open up land for settlement and cultivation. Modern tree cover is therefore far less dense and far less widespread than in ancient times, and the moist deciduous forests of trees growing up to 120 feet tall that once covered most of the upper parts of the Greater Indus Region have widely been replaced by dry deciduous forest, with shorter trees, and by scrubby thorn forest, associated with poorer soil fertility, lower water retention, reduced plant cover and diversity, and greatly reduced fauna. Forest regeneration has been inhibited by grazing herds of domestic animals, which have also had a marked effect on other vegetation.

Firing the enormous quantity of baked bricks used in constructing Indus cities could have decreased the extent of vegetation cover, although studies have shown that even the present-day scrubby vegetation of the region could have pro- vided a sustainable source of fuel adequate for the purpose. Manufacturing charcoal for the fuel used in smelting copper may have had a more significant impact. During the Harappan period, charcoal was



made from a variety of trees from the local deciduous forests, but by the latest Harappan levels it was being made only from scrubby acacia, and animal dung was also in use as fuel, suggesting that tree felling had significantly affected the local forest cover by this time. Deforestation and overgrazing over the millennia have caused considerable erosion, increasing runoff and hence increasing the volume and speed of water in the Indus, in turn increasing the risk of excessive and devastating floods. These activities have also brought about environmental degradation and a reduction in moisture retention by soils and plants, as well as the reduction or local extinction of much of the native fauna. This process may have begun by the Indus period: Evidence of environmental strain by the second millennium BC has been found in some areas such as the Kachi plain. Nevertheless the severe degradation of much of the flora and fauna of the subcontinent is by and large a more recent development.

In ancient Mesopotamia and in parts of South Asia in historical and recent times, regular irrigation over a prolonged period caused salinization, eventually turning land into a salt waste where cultivation became increasingly difficult and eventually impossible. Although this cycle would also

have taken place in the ancient Indus Valley if artificial irrigation had been employed, there is no evidence from the Indus period either of large-scale irrigation or of salinization there: The annual river floods and limited rainfall seem to have been adequate to support agriculture in the plains.

Conclusion: The purpose of the present chapter was to focus on the physical context of what will be discussed in the rest of the book. Because archaeology and prehistory is concerned essentially with the story

of human cultural growth in the physical context of land and environment, they cannot be put outside the general academic milieu of its study.

It has been shown that the Greater Indus Valley is surrounded by natural barriers on all of its sides. To the south is the Arabian Sea, which isolates it from the landmass across the waters. To the north are the high rising Himalayas, which isolate it from China and beyond. To the west are several mountain ranges that separate it from Afghanistan and Central Asia. To the southwest is a series of deserts, which are barriers between Pakistan and Iran. To the east is the vast Thar Desert that separates it from modern India. Nevertheless, it is not, and it has not been, an isolated region of the world. There are several passes in the mountain ranges in the west which always provided Pakistan convenient routes to interact with the peoples of Central Asia and to some extent Iran. The Arabian Sea was open to make contacts with the peoples of the Persian Gulf and Mesopotamia. Similarly, there were at least two nodes, one in the north and one in the south, that allowed the people of Punjab and Sindh to come in contact with those of the Divide and Gujarat, respectively. Thus, in spite of its geographic position, ancient Pakistan did not exist in isolation.

It has also been shown that Pakistan is a land of varied geographical regions: arid highlands of Baluchistan, greener mountains of the north, the plateau of Pothwar, the flood plains of the Indus and its tributaries, the deserts of Thal and Cholistan, the delta of the Kutch, and a long stretch of coast on the Arabian Sea. These varied geographical features provided the Indus man with varied environments, which in turn, afforded him to take advantage of the varied subsistence resources that the given environment offered. A mosaic of cultures, thus, developed, which was eventually to converge into an advanced civilization of the Bronze Age. It is this genius of the Indus man that makes the story of his adaptability, survival, and progress so interesting.

The Indus cultures flourished over a vast tract of the land which today ranges. Within this area today there are patches of wet mountains in largely a desert expanse. The rainfall pattern is much varied from largely winter rains in the southwest to largely summer monsoons in the north. Did a similar pattern exist during the Indus Age and was the climate pattern as constant as is witnessed today? This has been a matter of serious enquiry since the first site of the Harappan Civilization was excavated. A particular point of interest has been the weather during the decay of the Harappan Civilization in late 2nd millennium BC in comparison with that during the rise of the civilization in mid 3rd millennium BC. Here two schools of thought have formed; one supports a comparatively wetter climate during the rise and duration of the Harappan Civilization while the other does not see much convincing evidence for it. The adherents of this opinion point to several geological indications to the fact that the climate of the Indus Valley has been the same for the last 10,000 years as we experience it to day.

Although debates on climate change, fluctuations in rainfall patterns, changes in river discharge rates, and tectonic activity remain an open question, they do suggest that in some instances the early Holocene was relatively a wetter climate which gradually dried up by the 5^{th} millennium BC to a level

that we find it today.

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Chapter 5

Pre-Urban Cultures of the Greater Indus Valley



The development of the Harappan Civilization is now seen as a consequence of the related developments in the early Indus cultures in Baluchistan, Sindh, and Punjab and these cultures, in turn, are considered

as the consequence of the preceding food producing Neolithic cultures of Baluchistan. The pre-urban cultures in the Greater Indus Valley therefore have great relevance to the origins of Harappan Civilization, i.e. the urban phase of the Indus Civilization. A review of these pre-urban cultures is the topic of the entire Volume II (*A Prelude to Civilization*); here we offer only a summary. The pre-urban cultures of the Greater Indus Valley are intimately connected with the theoretical debate on the "origins" of the Harappan Civilization but we shall not indulge in this discussion at this time, preferring to defer it to the next volume, which is largely devoted to the theoretical and the abstract issues.

For the sake of the present discussion and ready reference, we divide the pre-Urban period of Pakistan's history into the following chronological order (Table 5.1.). Possehl (13) has formulated this chronology in terms of stages and phases as depicted in Table 5.2

Both of the above presentations are linear, which in actuality is not the case. It, nevertheless, systematizes this long period of prehistory and is a useful tool in studying the progression of cultural change in the pre-urban Indus Valley.

Early Food-Producing Societies: In the millennia following the end of the last ice age, farming began in many parts of the Old World. One of the earliest regions to adopt farming was the Near East. There, during the final millennia of the last glacial period, in some areas hunter-gatherers began to occupy sedentary settlements, exploiting storable foods such as nuts and cereals. Some of these peoples domesticated cereal plants, such as barley and wheat, that grew wild in that area, and this led to agriculture. They also domesticated a few wild animals, such as goat, sheep and cattle. This led to animal herding and pastoralism. Farming and

Table 5.1. Approximate Chronology of the the pre-Urban period of the Indus Age

Before 7000 BC: Development of postglacial hunter-gather communities; beginning of sedentism and hesitant at! ! ! tempts to domesticate plants and animals.
7000 - 6000 BC: Neolithic farming communities without any sign of pottery; farming community establishes at ! ! ! Mehrgarh and probably some other isolated sites in Baluchistan. This time period is archaeologically ! ! ! represented by Mehrgarh I.

6000 - 5000 BC: Neolithic settlements with pottery, farming communities in Baluchistan, such as Mehrgargh II and ! ! ! Kili Gul Muhammad, similar settlements in adjacent areas in southern Afghanistan, eastern Iran, and ! ! ! southern Turkmenistan.
5000 - 4300 BC: Larger Neolithic settlements in Baluchistan, increased pottery, small scale irrigation, limited ! ! ! use of copper.
4300 - 3800 BC: Many Copper-using farming communities (Chalcolithic cultures) in Baluchistan and adjacent Sindh, ! ! ! wheel-turned pottery, copper casting, beginning of distinct regional cultures.
3800 - 3200 BC: Chacolithic regional cultures: Kechi Beg (Baluchistan), Hakra (Ghaggar-Hakra plains), Ravi ! ! ! (Harappa).
! ! Increased number of farming villages throughout Baluchistan, Sindh, and some areas of Punjab.
3200 - 2500 BC: "Early Harappan" regional cultures: Amir-aNl (Sindh-Baluchistan), Kot Diji (Punjab-Baluchistan), ! ! ! Damb Saadat (northern Baluchistan), Kulli (southern Baluchistan). Indus cultures diffuse into the ! ! ! Indo-Gangetic Divide (Kalibangan), farming spread in adjacent areas of Gujarat (India), seals with! ! ! out inscription, emergence of pre-urban settlements in eastern Iran and southern Tukmenia 2500 - 2600 BC: Transition period from pre-urban to urban society; Mohenjo-daro and Harappa stat taking shape; ! ! ! any pre-urban settlements burnt or abandoned, some rebuilt; cultural integration into a common civi! ! ! ization; growing craft specialization, increased trade links.
2600 - 1900 BC: Hey-days of the Indus urban culture (the Harappan Civilization). !
!!!

animal husbandry are not generally an easier way of life than hunting and gathering, and there must, therefore, have been a compelling incentive that led communities to take up agriculture and sedentary living.

Whatever factors provided the initial stimulus, the combination of agriculture, food storage, and sedentism promoted population growth. The

Table 5.2. Possehl's Chronology of the Indus Age

Early Farming Settlements
Kili Gul Muhammad 7,000 - 5,000 BC Basked-Marked Phase 5,000 - 4,300 BC

Developed Agricultural Villages
Togau Phase 4,300 - 3,800 BC Kechi Beg Phase 3,800 - 3,200 BC Hakra Ware Phase 3,800 - 3,200 BC

Early Indus Period
Amri-Nal Phase 3,200 - 2,800 BC Kot Diji Phase 3,200 - 2,600 BC Quetta Ware Phase 3,200 - 2,600 BC Kulli Phase 3,000 - 2,000 BC

Harappan Period 2,600 - 1,900 BC Post-Harappan Period 1,900 - 1,000 BC tools, jewelry made of shell, steatite, lapis lazuli, turquoise, and calcite, and sometimes by young goats. One grave yielded a bead of native copper, probably produced by cold hammering.

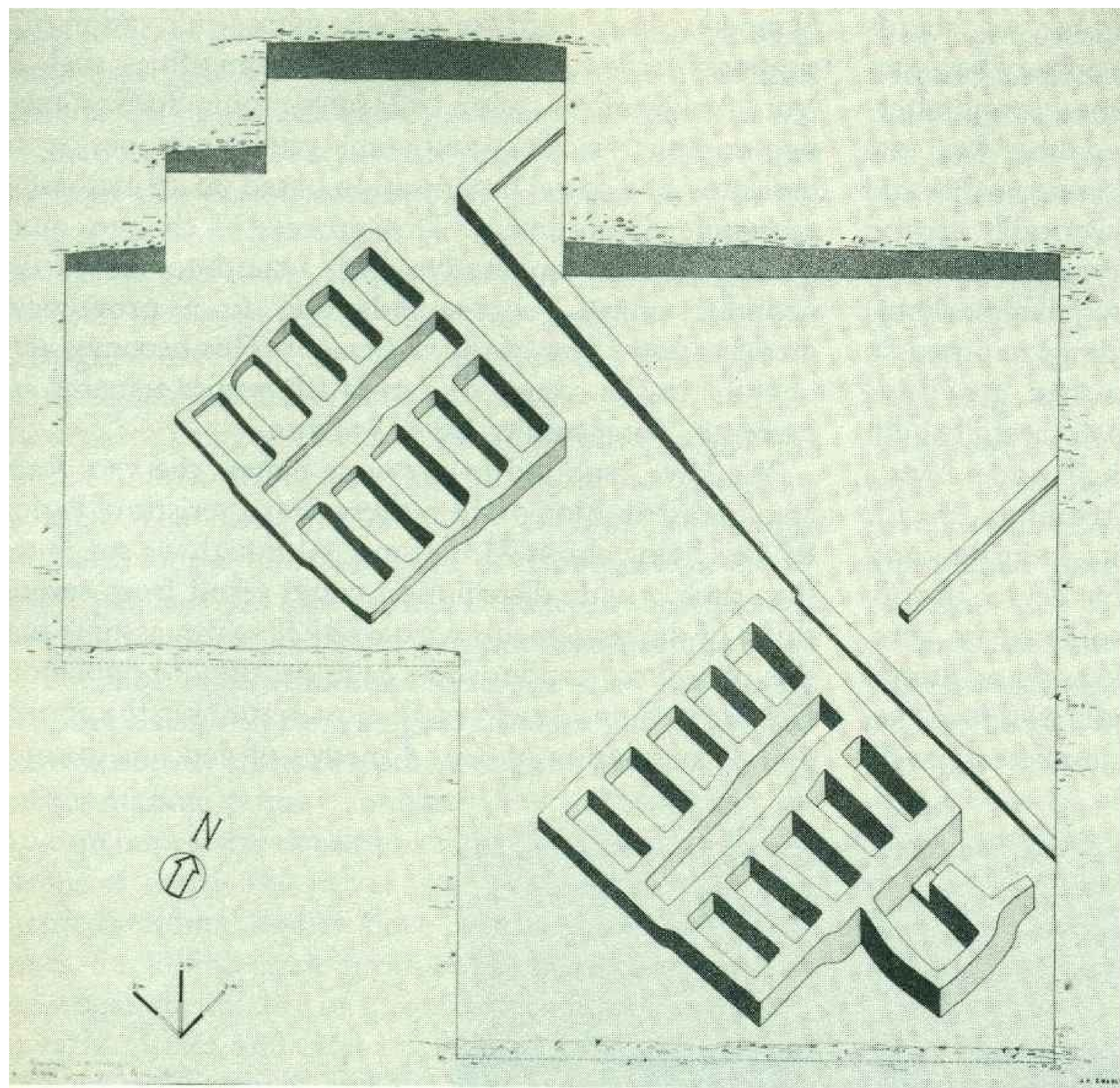
Merhrgarh is still the only settlement of this antiquity known from the Indo-Iranian borderland region. A few other aceramic (pre-potterry) farming sites, such as Kili Gul Muhammad, near modern Quetta, and Gumla on the plains of the Gomal River, may date back to the sixth millennium BC, although their chronology is not secure. By the sixth or even seventh millennium there were farming

communities to the south and east of the Caspian Sea and in northern Afghanistan, but almost nothing is known of this region in the seventh millennium BC. This makes it difficult to understand the wider context of the evidence of farming at Mehrgarh and Kili Gul Muhammad in Baluchistan.

It is still unclear how ancient Pakistan, represented by Mehrgarh, relates to the West Asian center of agricultural development. Did farming colonists bring in wheat, barley, and goats; did indigenous Baluchi hunter-gatherers acquire these through their long-range exchange networks and gradually turn to farming; or were these plants and animals domesticated by the Baluchis from local

community relationships provided as a buffer against the risks of agricultural failure and as a means of obtaining commodities from other communities and regions. Once agriculture developed, it tended to spread to other areas by various means. In many cases farmers established new settlements in adjacent areas as their original settlements expanded in size. In other cases, hunter-gatherer communities acquired domesticated plants and animals from their farming neighbors by trading, raiding, or simply through cultural diffusion. In other cases hunter-gathers turned to farming independently. By 7000 BC, farming communities existed throughout the regions of the Near East where rainfed agriculture was possible, including the western Iranian plateau and the southern Zagros Mountains.The farmers cultivated wheat, barley, rye, and a variety of pulses, and some were beginning to herd sheep and goats or raise pigs or cattle.

Around the same time, there was also a community practicing agriculture, as well as hunting and gathering, at Mehrgarh on the arid Kachi plain at the borders of Sindh and Baluchistan in Pakistan, a triangular extension of lowland alluvium west of the Indus plains. Excavations there uncovered a settlement going back to about 7000 BC. The villagers lived in rectangular houses built of mud bricks, divided internally into two or four rooms. There were also doorless, compartmented buildings for storage (see Figure below). They used stone blades, grindstones, bone tools, and baskets lined with bitumen, and they produced a few unfired clay figurines though they did not make pottery. The dead were interred between the houses, accompanied by some modest grave goods, including stone



Plan of compartmented buildings, Period IIB, at Mehrgarh

wild stock? The question has been intensively studied and many pieces of evidence have been accumulated. This evidence has been amply discussed in Volume II (*A Prelude to Civilization*) of this series.

The Consolidation
subsequent developments

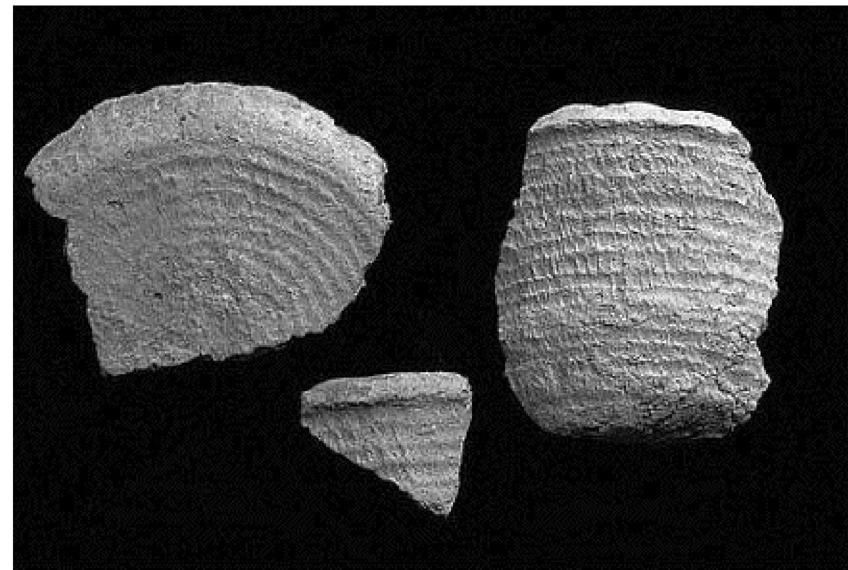
of Agriculture: The are somewhat better understood.Throughout the early period of Mehrgarh, cattle and sheep increased in importance, and by 5500-5000 BC the people of the village had come to rely mainly on domesticated cattle, sheep, and goats for their meat, rather than on hunted game. At the

same time, naked six-row barley became the staple cereal. Several varieties of wheat were also grown in small quantities. Traces of a cotton thread were detected inside a bracelet of copper beads from a grave dating to this period, currently the earliest known evidence of cotton textile in the world. It was certainly a plant growing in the wild in the surrounding areas.

By the mid-sixth or early fifth millennium, a number of farming settlements are known to exit in Baluchistan, including Kili Gul Muhammad, Anjira, Siah Damb, and Rana Gundai. Some, such as Anjira, were pastoral camps; others, such as Early Settlements!Mehrgarh, were larger communities practicing culti

vation. Mehrgarh continues to provide the most Kachi is a flat alluvial plain, an extension of the Indus Valley plains into an comprehensive information on the period. Domestianomalous nick in the eastern edge of the Iranian plateau. It is thought that the cated cattle increased in importance at the expense

of other animals, and sheep became more numerPleistocene Indus River flowed in this area, so that the alluvium is quite deep.
but
it is more a
route of
the


Basket-marked base and rim, Bakar Buthi,
Las Bela, Baluchistan

Basket-marked base and rim, Bakar Buthi, Las Bela,
Basket-marked pottery sherd - base and rim - from
Baluchistan
Bakar Buthi, Las Bela, Baluchistan Indus and
ous than goats. A number of charred cotton seeds
Jarrige’s excavations have confirmed
that erosion by this river has removed a significant portion of the Mehrgarh site.
identified there suggest either cultivation or the use

of the wild cotton plant. Small-scale irrigation is apThe Nari and the Mula River are other significant

sources of water in Kachi.parently implied by some of the varieties of cereals under cultivation (14). A large number of compartExcavation at Mehrgarh began in 1974 under the leadership of J-P Jarrige andmented storage buildings indicate the increasing continued into the 1980s, even later. The archaeological remains of differentimportance of cereal cultivation in this area and

periods are spread over 200 hectares of land on the banks of the river Bolan, andperhaps imply some social complexity.
different parts of the site bearing evidence of occupation in different periods

An increased range of craft activities took place in the settlements of this period, notably the have been given separate numbers, such as MR1, MR2, MR3, etc. manufacturing of the first local pottery vessels. These were made in a variety of simple ways: by The archeological story of this part of the Kachi plain does not end here. Anothercoating both faces of a reed core with clay, by mold

is
taken
up
by
ing clay in a bitumen-lined basket, or by covering
Nausharo, a site belonging to the Indus
civilization, and Pirak, which covers the transition to the Iron Age here.the inside of an old basket with clay and firing it,
However, the present chapter is primarily concerned with the Mehrgarh Period I

destroying the basket and producing a distinctive type of pottery known as *basket-marked ware*. Pots and partly with the nature of the evidence up to Period III. According to Jarrige,were also built up from slabs and pieces of chafftempered clay and sometimes coated with a red

millennium and the end of Period I, or the
beginning of Period II, is unlikely to be much later than c 6000 BC. It appears
slip: this ware is known also from contemporary

sites across the Iranian plateau. Later in the period, that by and large the Period II as a whole, inclusive of its phases a, b, and c, issome of the pottery was made on the turntable (or spread throughout the sixth and the first half of the fifth millennium BC. Theslow wheel).
archaeological sequence listed in the associated Table 4.1 highlights the

Contemporaneously, a number of huntergather settlements are known in Baluchistan, in coastal regions, and inland in the Thar Desert in the 97

eastern part of Sindh. In the northwest, there are a few sites, such as Tharo-Hill, and in the coastal area of Makran to the Indus delta, where surfacecollected material suggests farming settlement and interaction between farmers and hunter-gatherers.

Village Farming Communities: By around 4300 BC, the number of settlements known in Baluchistan and in the adjacent lowlands of Sindh had greatly increased, and often they were larger than earlier sites. These settlements included Periano Ghundai in the Zhob Valley, Mundigak in the Kandahar

region of Afghanistan, Faiz Mohammad in the Quetta Valley, Togau in the Sarawan region, and Sheri Khan Tarakai in the Bannu Basin. Occupation also continued at Mehrgarh and other existing settlements.

Pottery, which had developed rapidly, was of fine quality, and many vessels were shaped on a wheel, allowing a degree of mass production, though others were handmade. Often the pots were painted with abstract or geometric designs. The widely distributed Togau ware vessels were decorated with stylized figures of caprids, birds, and other animals; somewhat similarly decorated wares were also being produced in contemporary Iran and Turkmenia. The geometric patterns are reminiscent of those created in later woven fabric and carpets in historic times in Baluchistan and Sindh. Several spindle whorls found at Sheri Khan Tarakai and other sites suggest that there was a flourishing textile industry. Mehrgarh had become a center of craft production by the early fourth millennium: there workshops turned out large quantities of fine pottery, beads of lapis lazuli, turquoise, shell, and carnelian, shell bangles, and bone and stone tools, including tiny drills made of phtanite (a hard green chert containing traces of iron oxide) for perforating beads. A deep deposit of debris at the site included the remains of circular kilns, ash, and pottery wasters. A range of industrial activities has also been found at other sites of the period.

The development of kilns used to fire pottery at high temperatures gave the people of Baluchistan advanced pyrotechnological skills, which they also employed in other industrial activities. The majority of beads at Mehrgarh were made of steatite in a variety of shapes but standardized in size. They were converted to a white color by heating, and faint traces on their surface show that they were coated with a copper-based glaze, creating a type of faience: This would have required a controlled kiln temperature of around 1000 degrees centigrade. The people of Mehrgarh also smelted copper ores, which were available in Chaghai and adjacent areas of Afghanistan. Gold was also worked, as is shown by the find of a tubular gold bead. The wellestablished agricultural economy now included not only the original varieties of domestic cereal but also oats, a new variety of barley, and two developed varieties of bread wheat *(T. aestivum compactum*, club wheat, and *T. aestivum sphaerococcum*, shot wheat). The latter was to become the variety of

as in Period II indicates the start of ivory crafts that played a very important role in the Indus Civilization a few thousand years after. !Harappan Civilization - The Material CultureVillage Farming Communities A cylinder bead in terra cotta was found in one of the compartmented buildings

still less than 5 hectares. Houses were generally of
wheat most commonly cultivated in Pakistan andIt is worth noting that many, even most, of the technologies that one associates neighboring India. mud brick, often with stone foundations. As in earwith Indus Civilization were put in place during the Togau phase, which began

of a cylinder seal. The motif is regular and portrays vegetation. Jarrige, Meadowlier times, it is likely that at least some of the inhabi

only at Mehrgarh. There was not any funerary archi
2,000 years before the first emergence of urbanization in Pakistan. There were
tants of these villages were involved in seasonal

tecture, but the rites were more varied, including
changes and growth, the development of bronze, the manufacture of stoneware
transhumance between upland and lowland re

both single and multiple inhumations and someknown in western Iran in an early context and the very

secondary burials of collected bones. Grave goods at Sheri
long
gions. Water buffalo was among the fauna exploited
carnelian beads, but much of this
Khan
Tarakai,
though it is not
known technology is a reflection of growth and development in existing ideas, of

bead from Mehrgarh could be considered as an whether it was domesticated or hunted. The fauna
were rare, usually consisting only of jewelry, worntechnologies put in place by the peoples of the Togau phase.earlymainly by adult women. Interestingly, the physicalof the cylinder seal that laterat Balakot included hunted animals, though surpris
prototype

characteristics of the people buried in the Mehrgarh
ingly, despite the settlement's proximity to the sea,

Architecture: The architecture of Mehrgarh III is based in Period II, domesticperiod III cemetery suggest the presence of reprebecame popular in Mesopotamia. Other finds inmarine resources were of little importance. Grape

sentatives of a new population, with affinities across
structures and compartmented structures, thought to be storage units, even

Mehrgarh II include violin shaped human figures of

the Iranian plateau and in the Near East, despite specifically gran aries,

unbaked clay colored with red ochre, animal

the strong cultural continuity from earlier periods.continued to be built. They

figurines, grinding stones, mortars, stone bowls,

tial increase in the density of settlement in Baluchisone another, however. The

and hundreds of chipped stone tools. Just like tan (Kechi Beg phase) and the expansion of people had from this region into the Indus Basin, particularly Period I, many bone tools were found, most of them

Cholistan (Hakra phase). During the later fourthcomplex plans, the product



Mehrgarh IIb, Cylinder bead (*after Jarrige*)

points with lustrous polish. Patrick Vaughn found a

millennium, settlements were developing across theof a community with a well

Iranian plateau at important nodes along the longnumber of chipped tools in association with red ochre. This is an interesting distance trade routes and in areas where highly beobservation since ochre may be used for the tanning of hides.prized raw materials were organization that may

to be found.These
formed a network that conducted trade in local andindicative of a redistribution

A ring, a bead of copper and a small copper ingot appear in an early level of system. A relatively marked Period IIb, but otherwise the lithic degree of social differenciation mightand bone-tool kit of the earlier indicated by the scale and period continue to be in use. Two complexity of craft activities complete sickles with insetand long distance trade. Architecture at other sitesmicrolithic tools, an ivory tusk,
seems to have been less lumps of red ochre andOrnaments from Mehrgarh III, MR2 cemetery, Togau

elaborate, based on mud and

Phase, sixth millennium BC (

grinding

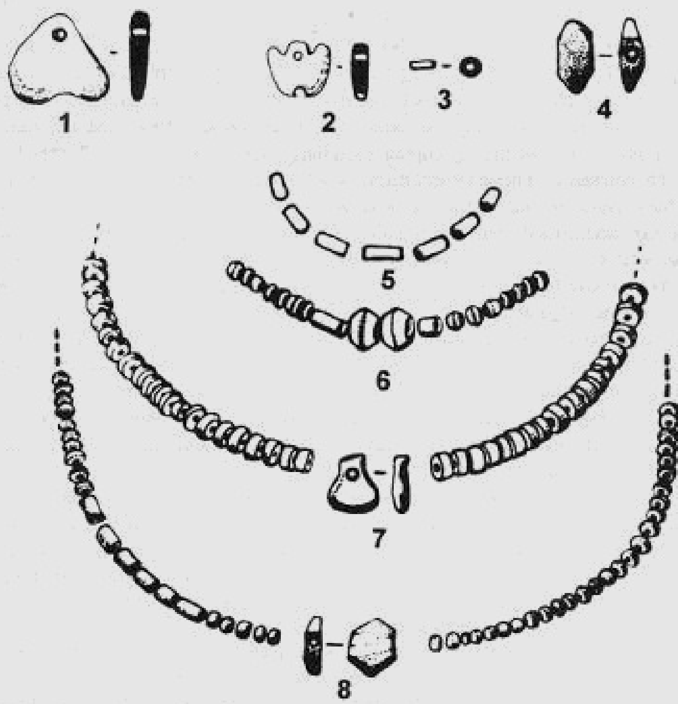


Painted sherd with stylized bull motif, Mehrgarh III.

*after Samzun and Sellier***)**

stones have been found. Graves have

mud-brick, often with stonebeen mentioned but the details seem



Ornaments from Mehrgarh III, Togau phase

(after Samzun and Sellier)

foundations.

Mehrgarh

is pips at Mehrgarh imply that this local fruit was now

to be missing. Cotton occurs in this being exploited, though whether it was cultivated is the only site known from this period so far, that has produced a building that

not clear. Simple irrigation was probably practiced in

would have been anything other than a domestic facility. period. Wheel made pottery begins

parts of the northwest: at Mehrgarh there is a ditch

to appear along with handmade onesor canal that may have been used for this purpose.Burials: The only Togau site with human remains is Mehrgarh III where 125Painted sherd from Mehrgarh III, Togau Phase, with in Period IIC.Craft traditions continued to develop. Differ

stylized bull motif

human interments were found in an area reserved as a cemetery; of these ninety

ences in the styles of pottery suggest the existence nine were excavated. There is a change in the burial customs at Mehrgarh at this

Pottery:

of regional groups, their distinctiveness determined

Bitumen or asphalt covered

time. Gone are the grave structures of Period I and II (Chapter 4) and theto a considerable extent by the topography of this

was baskets were found in Period I. Some had been used in the preparation of themountainous region, but there are also strong similinked into an interaction sphere in which innovaearliest ceramics at Mehrgarh. Further thoughts on this came to light in thelarities between the wares, including the frequent

tions and ideas as well as actual commodities circu
use of geometric decoration. Other designs inPage 212

lated freely.course of the study of Period II remains. Asphalt or bitumen probably came fromcluded animals, such as cranes and caprids and

About a hundred and fifty sites are attributed
to the Kechi Beg phase in Baluchistan, many more
are known in the preceding period. These includePage 186
both existing settlements, such as Mundigak,
Gumla, Rana Ghundai, and Mehrgarh, and new
sites, such as Damb Sadaat in the Quetta Valley
and Adam Buthi in southern Baluchistn. Settlement
extended eastward in the coastal region to the
Somiani bay where Balakot was established as a
coastal village, probably by about 4000 BC.

Some villages, including Sheri Khan Tarakai,
were now around 15 to 20 hectares in extent, al
though the majority, such as the Kechi Beg, were
especially snakes. Often the animals had become stylized into simple zigzags. Although most designs were painted in one or several colors, some were molded as raised ridges or snakes.

At Sheri Khan Tarakai, craft products included many terra-cotta figurines. The majority of these were very stylized humans in the form of cylinders with facial features and applique breasts, attached to exaggerated buttocks and splayed legs in a standing or sitting position; others were bottle shaped. A few figurines depicted bulls, and all bore painted features and decorations. Similar human

exotic materials. Much of West Asia, from Mesopo
tamia to Turkmenia, and the Indus region both humans and cattle was found at Sheri Khan

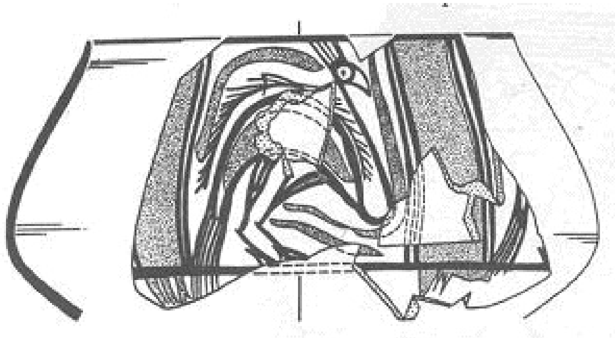
with the Kechi Beg phase. Tarakai. The humans are all highly stylized and

are recognizable type for the region at the time.

Sheri Khan Tarakai produced

Ancient Pakistan - An Archaeological History Two general types emerge from the collection. The first has no shoulders and a stem-like body, pottery vessels set on the floor, along with other usually with a pinched face and appliqué breasts. Sheri Khan Tarakai are in a very fragile state and have not been completely analyzed. They include examples of zebu, sheep, goat and water buffalo.

A large number of terracotta cones with a carefully made hole in one end, which
comers moved into territory previously inhabited
does not go all the way through, were recovered from Sheri Khan Tarakai.
only by hunter-gatherers. This settlement spread to
Although the function of these objects is not known, the excavators note that
as far as the Ghaggar-Hakra basin where a large
these objects have parallels to the north. Three small terracotta objects thought
concentration of sites has been found. Here surface survey has led to the identification of around a hun



Cranes painted bowl from Sheri Khan Tarakai (*after Farid Khan*)

possibly to have been boat models were found. These fall just short of being **A crane painted bowl from Sheri Khan Terakai (***after Khan***)** completely convincing as boat models, but are extremely interesting objects.
is confined to the Bhawalpur area of the Cholistan Desert. and bull figurines have been found in smaller numbers at other sites, including Mehrgarh.

A marked reduction in the use of flint and heavy-duty stone tools reflects the growing importance of metal as a material for making tools. Microliths were now used mainly as insets forming the cutting edge of sickles. Copper was also made into pieces of jewelry, such as beads and pins. An increasing variety of materials were being used for beads, including agate and jasper.

Although sporadic earlier finds suggest some, probably seasonal, movement of men and beasts from Baluchistan into the adjacent areas of the InVillage Farming Communities**!** dus Basin, this period (fourth millennium) saw the

first substantial settlement on the plains. The new

domestic material such as beads, terra-cotta andartifacts, most in terracotta, but included bone and stone. No metal is in

The other type has a bottle like torso with shoul
shell bangles and spindle whorls, and bone andders and reduced arms. The bull figurines from the great Thar Desert, which geographically sepa
Sheri Khan Tarakai are notstone tools. Manufacturing debris, such as broken agate and jasper drills, shows that the beads wereremarkable, but rates

document the participation of the inhabitants ofA large collection of terracotta figurines of both humans and cattle was found at though far from the hilly Baluchistan, surprisingly made in the settlement; some were of terra-cotta showSheri Khan Tarakai. The humans are all highly stylized and are recognizablequite similar to those of Baluchistan, showing atype for the region at the time. Twostrong affinity between the two peoples.general types collection. The first has no shoulders

Sutlej River, and on northwest and west by the Indus. In the east, its natural boundary is the Thar

and a stem-like body, usually with aDesert. The western fringes of the Thar Desert pinched face and appliqué breasts. The other type has a bottle like torso

er,also called the ‘Hakra Depression’. The climate of Cholistan is arid, annual average rainfall is not

with shoulders and reduced arms. Themore than 6 inches. However, even a meager bull figurines Tarakai

an un-estimated but large number of economically

valuable herds of camel, cattle, goats and sheep,are documentsubsisting entirely on desert plants and rain water and others of materials from inhabitants of the site in this tradition.collected in community ponds called

distant sources such as car
nelian,
lapis
lazuli,
the site in this tradition.A large number of terra
Page 216
the close to the permanent village settlements. They

cotta cones with a carefully made hole in one end,
which does not go all the way through, were re
covered from Sheri Khan Tarakai. Although the

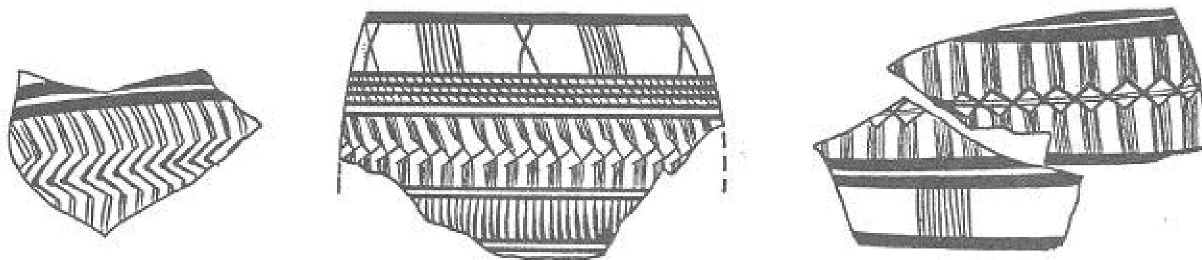
perforated with a copper wire.

function of these objects is not known, the exca
vators note that these objects have parallels to
wait there until the monsoon rains return. The nomads exchange their products for manufactured goods and food grain in towns and villages. Thus, populations exist independently, each group utiliz

were
unaltered;
others
were
the north. Three small terracotta objects thought
fired white or coated in blue
ing a different ecological niche, they are interdepossibly to have been boat models were found.
!

pendent essential components of the larger, well-knit and viable social and economic system of the region.

hubThe present-day analogy can be projected back theinto the prehistoric past because convincing arTogau



Jungal painted pottery from Rana Ghundai, Kechi Beg phase (*after Fairservis*)

Jungal painted pottery from Rana Ghundai, Kechi Beg Phase (

Jangal painted pottery from Rana Ghundai, Kechi Beg Phase (
after Fairservis)
after Fairservis)

Terracotta bangles, always in a crude fabric with a red slip were found but were
Village Farming Communities
These fall just short of being completely convinc

not common. This is in contrast to other Kechi Beg sites in this region. ing as boat models, but are extremely interestingadred sites with sherds of Hakra Ware pottery, which included various handmade black-slipped, painted, objects. Jungal painted pottery from Rana GhunA large number

of beads, in a variety of colorful stone, including lapis lazuli, dai, Kechi Beg Phase (*after Fairservis)*
Terracottaduring mud applique, and basket-marked wares. These chaeological evidence for such an interaction has kiln turquoise and limestone, was found at Sheri Khan Tarakai. These stones, and the bangles, always in a crude fabric with a red slipspecialized

settlements were apparently made on virgin soil. been discovered in Cholistan and elsewhere, esoccurrence of shell fragments, are indicative of the wide contacts of the ancient were found but werennot common. This is in conassociated with the Togau phase Since none have been excavated, it is not possible pecially in Basluchistan.inhabitants of Sheri Khan Tarakai. Twenty-three bone tools have been reported;trast to other Kechi Beg sites in this region.at Mehrgarh, with six meters of
to ascertain their nature, but it is likely (on the basis A large number of beads, in a variety ofdeep, looselythese include awls, points, spatulas and a rectangular object that has been
of the density and nature of the material found
there) that some were temporary camps occupied colorful stone, including lapis lazuli, turquoise andbroken kiln walls and wasters oflows, it should be pointed out that the original patcarefully perforated. A large number of querns and other ground stone food
by pastoralists, probably during the rainy season
limestone,
was
found
at
Sheri
Khan Tarakai. over-fired
tern of domestic settlements and other types of
pots.
sites in most of Cholistan has largely remained processing tools was there. Ring stones, axes and small palettes were also found.
when the region was covered in grass, and that These stones, and the occurrence of shell fragfrom the bottom to the top ofintact because economic development in the reThe chipped stone tools from Sheri Khan Tarakai form a rich and varied
others were farming settlements with mud brick ments, are indicative of the wide contacts of thethis depositgion has been slow. Difficulties of developing thewas
houses.collection. This is basically an undistinguishable flake tool making tradition, ancient inhabitants of Sheri Khan Tarakai. Twentylacking in true microlithic types. The faunal remains from Sheri Khan Tarakai three bone tools have been reported; these inthat
information: Jalilpur and Harappa, both on or near clude awls, points, spatulas and a rectangular
homogeneous, it is also evidentdesert extensively have saved the ancient sites
Farther north, two other sites furnish more this from destruction. At the same time the drift sand
are in a very fragile state and have not been completely analyzed. They includestratified trash accumulated in ahas advanced 20 to 25 miles westward from theobject that has been carefully perforated. A large riginal desert line and has buried an uncertainnumber of querns and other ground stone foodrather short span of time during the Ravi River in the Punjab. Terracotta net sinkers
examples of zebu, sheep, goat and water buffalo.
at Jalilpur show that fishing was important to the

people of this settlement, but domestic sheep, goats, and cattle also played an important role in Hakra

Ware Phase their economy. The remains of mud brick houses with beaten earth floors were found, though the exHakra Ware phase is confined to the Bhawalpur area of the Cholistan Desert.

processing tools was there. Ring stones, axes which potters workednumber of small sites under it. and small palettes were also found. The chipped intensively in this area. Growth stone tools from Sheri Khan Tarakai form a rich is also seen in the improvementof regional archaeological assemblages in the

of other crafts and technology.
cavations were too limited to reveal any details of
their plans.The area is bordered on the north by the Sutlej River, and on northwest and west
Settlement began at Harappa by 3300 BC
by the Indus. In the east, its natural boundary is the Thar Desert. The western

and perhaps as early as 3500. Houses there were
fringes of the Thar Desert are clearly defined by the riverbed of Hakra River,
constructed of wooden posts with reed and clay

roofs, and bell-shaped pits lined with clay were
used to store wheat and barley. One house, aban Page 217
doned with most of its contents, had a number of
There is not much more copper in Mehrgarh Period III but now there is evidence for melting, refining and possibly smelting



The art of pottery making became became wide

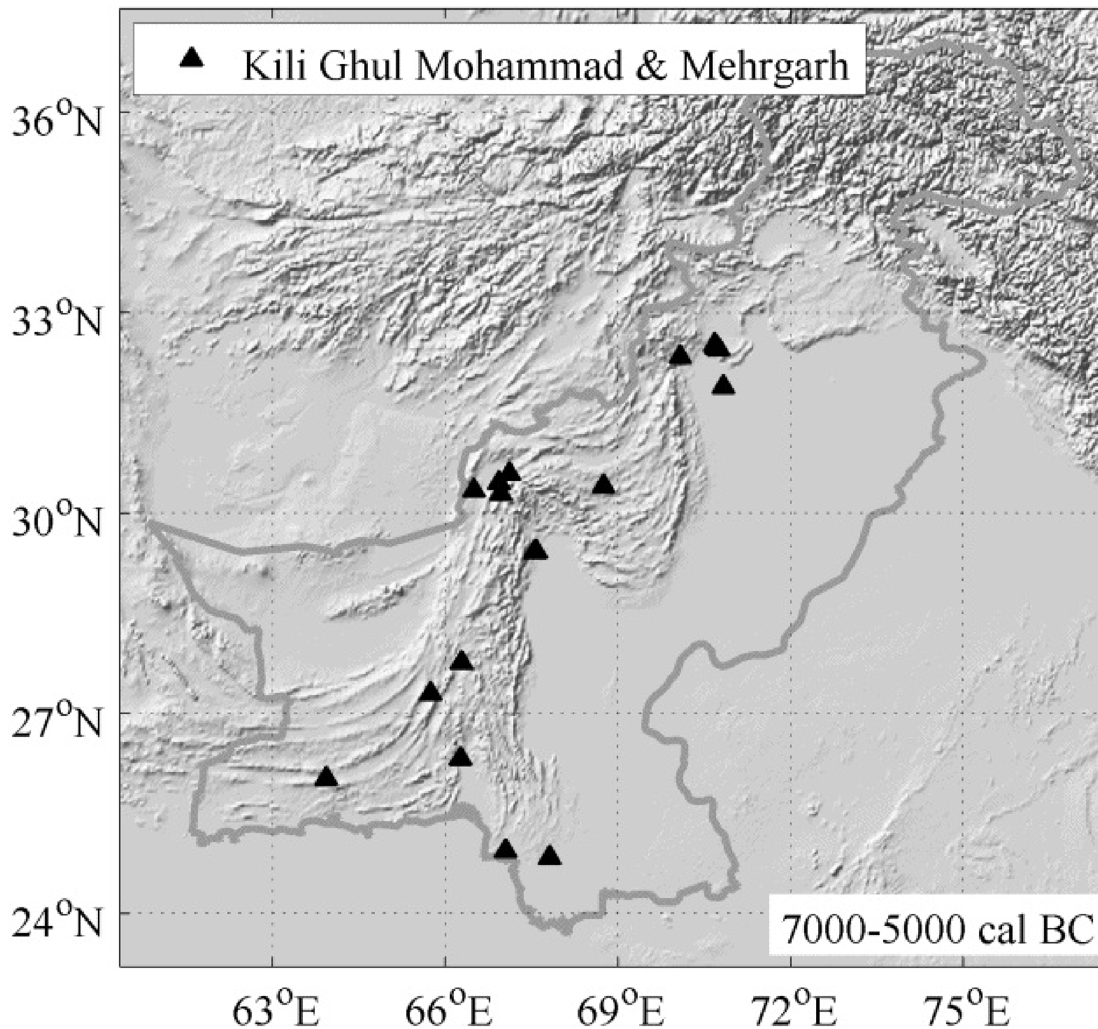
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copper. Testimony for this comes from a building of domestic type with three **spread by 4000 BC**

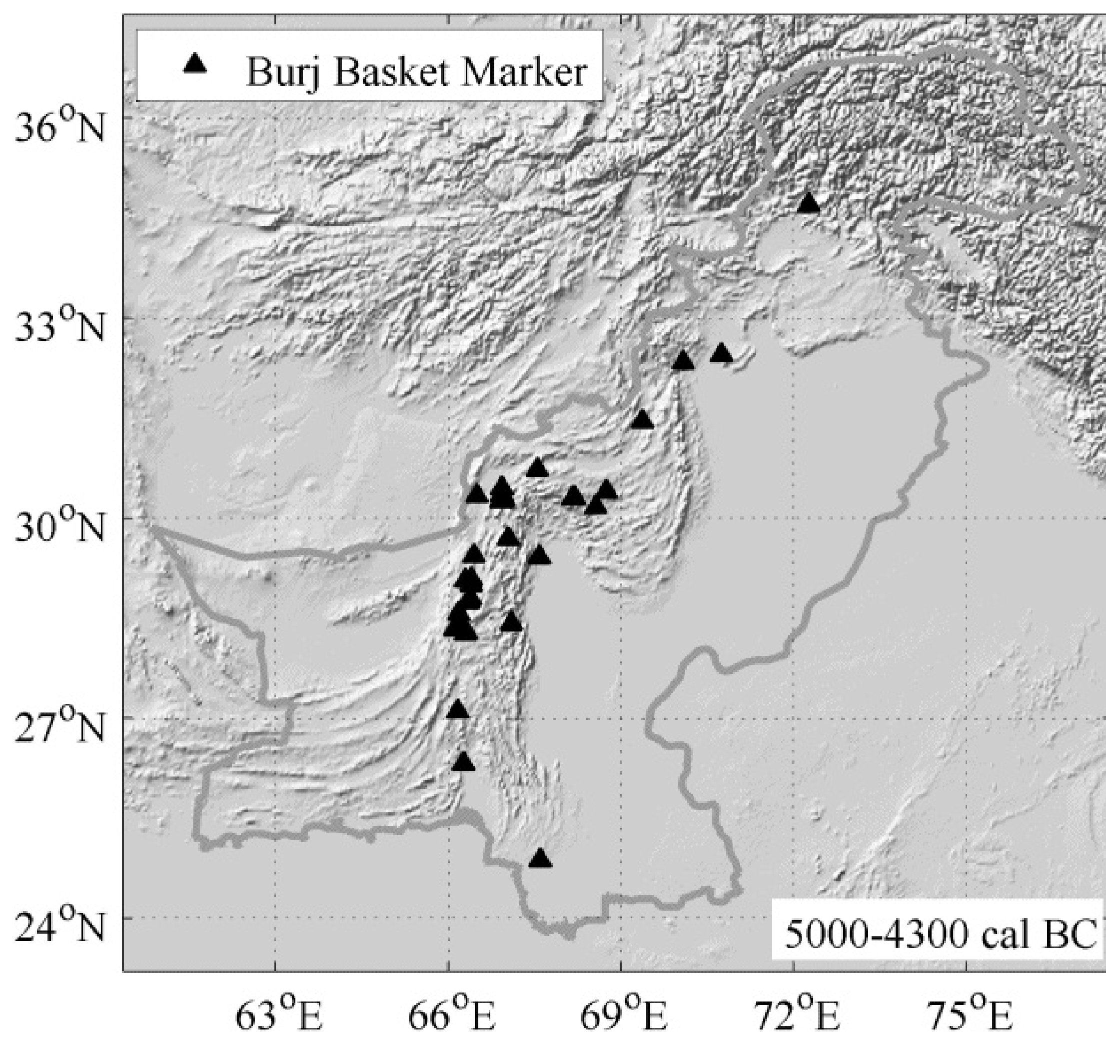
throughout the Greater Indus Valley.walls which is open on the western side. The floor and walls were burnt, and the

excavation team believes that it was used as a firing structure. This building contained one complete and thirteen broken crucibles with copper degs and stains. An important product of this new craft is an early example of a pin with double spiral head. Three compartmented seals were found at Mehrgarh III along

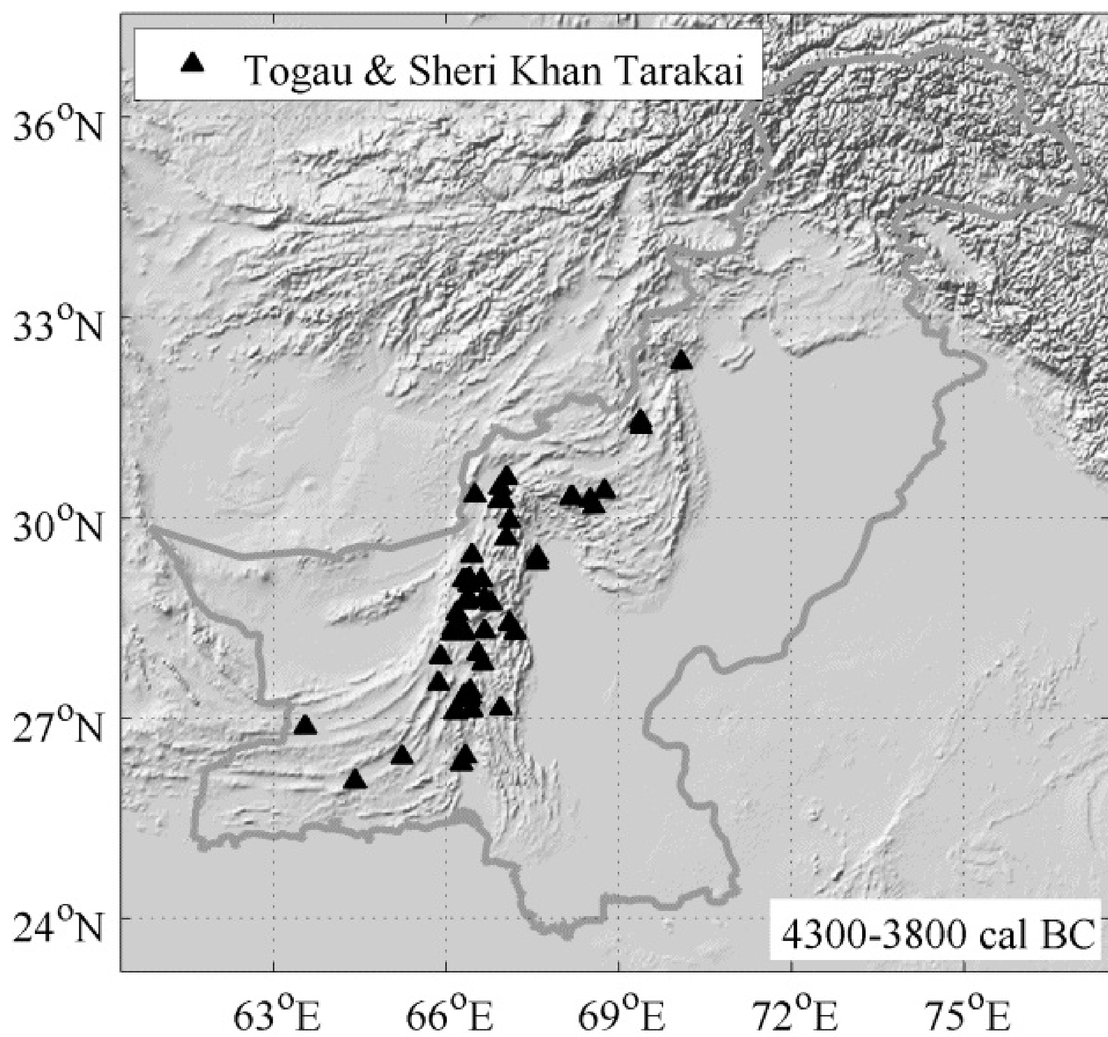
with unidentifiable fragments of the metal and one tubular gold bead is also



c) d)

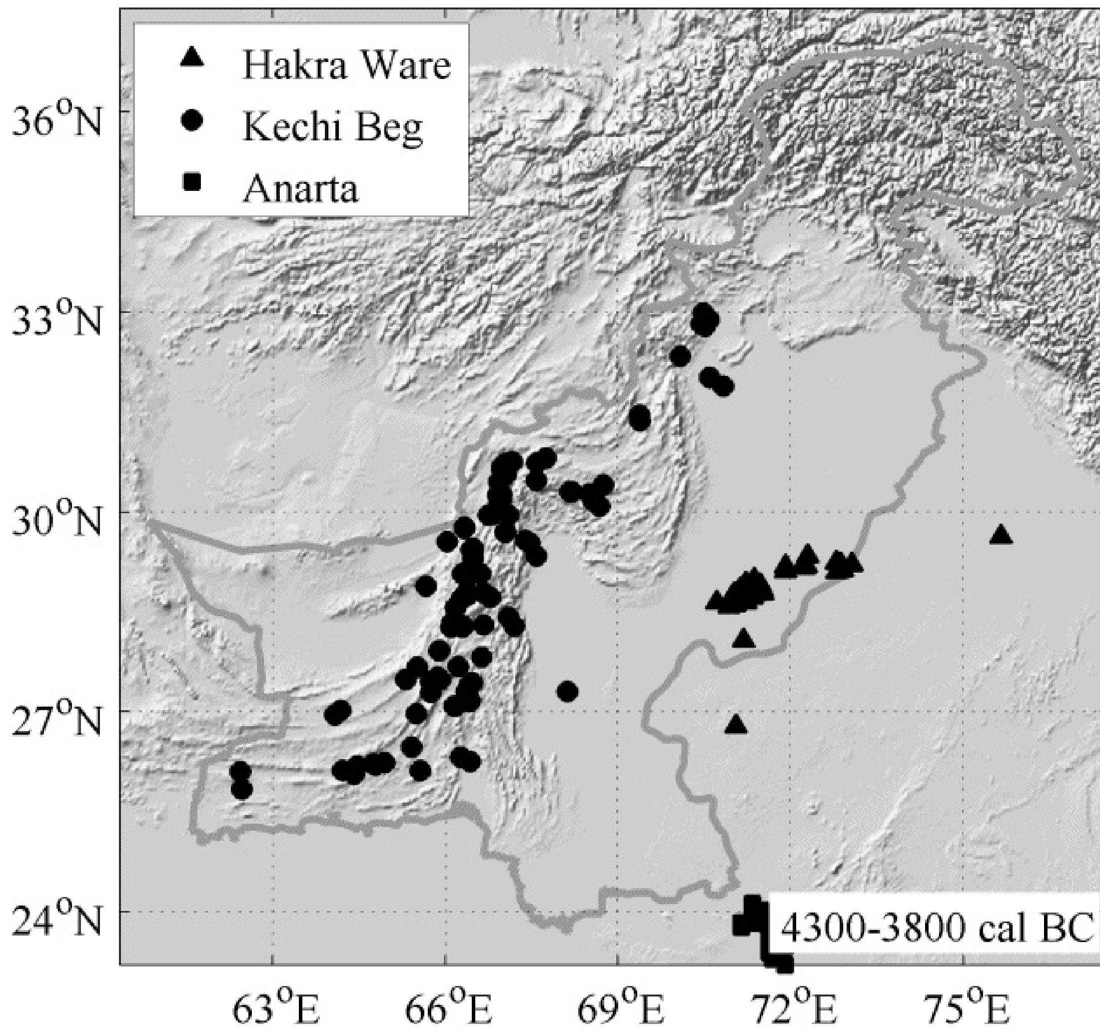


Burj Basket Marker
36°N
33°N
30°N
27°N
24°N
63°E
66°E
69°E
72°E
75°E
5000-4300 cal BC



Togau & Sheri Khan Tarakai
36°N
33°N
30°N
27°N
24°N
63°E
66°E
69°E
72°E
75°E
4300-3800 cal BC

e) f)



Spatial distribution of sites with artifacts attributed to the pre-urban Neolithic in four cultural phases: c) 7000-5000 BC; d) 5000-4300 BC; e) 5300-3800 BC; f) 3800-3200 BC (*R.W.Law, ref. 24***)** green glaze.

Among the most interesting finds at Harappa
are a number of sherds bearing a sign incised be
fore firing or scratched on afterward. In one case
wares of Cholistan. It was all handmade until the end of the period, when it began to be made on the slow-wheel. The remains of a kiln for firing the pottery, built of mud bricks, was found in the settle

there were three signs in a line. Some of these rement. The pots included cooking vessels and bowls,

sembled signs used later in the Indus script, sug [2002]. b) Geography, topographybut also pedestaled vessels that were to become

gesting that they represent an early stage in the one of the most distinctive forms in the Indus pot

development Lawwriting. [2011].werec)–e) Spatial distributiontery repertoire. Many were decorated with poly

carved bone button seals, something also known

, 2011] in four Neolithic phases: c) 7000–5000 BC d)from Mehrgarh where they were made in terra-cotta

as well: these bore geometric designs. Another ex
citing find was the impression on a terra- cotta bead
of a piece of plain weave cloth.

The pottery at Harappa, called Ravi Ware by
the excavators, was quite similar to the Hakra
chrome designs, including geometric patterns and birds; some of the motifs were to become very characteristic of later Kot Dijian and Mature Harappan pottery. Hakra and Ravi pottery included a variety of wares that recall earlier or contemporary styles in Baluchistan and the Kachi plain.

model is described by Wirtz and Lemmen [2003]; Lemmen [2011], here, we outline the model insofar as relevant

The sites are generally located on or close to the former Regions farther to the southwest also saw

settlement expansion in this period. In the piedmont region fringing the lower Indus plain, several settlements, including Amri and Ghazi Shah, were established in localities raised above the Indus alluvium, generally with access to thermal springs and seasonal streams running off the Kirthar Range. This region, like Cholistan and Punjab, offered excellent seasonal pastures for domestic animals.

Farthersouth,theearliestoccupations probably belong to this period. The inhabitants of these settlements used pottery that differed from that of Baluchistan wares, and there is a strong possibility that this region was visited seasonally by pastoralists from the Indus borderlands, resulting in contacts and the cultural exchange of materials and ideas.

The Early Harappan Period (3200-2600) : The late fourth and early third millennia saw the spread of farming communities in the Indus Basin

degree of



Wide shouldered black slipped vessel of Hakra Ware period (*after Mughal*)

Wide shouldered black-slipped vessel of Hakra Ware Phase (*after Mughal*)

sites are mounds of

and eventually as far as the Indo-Gangetic Divide and Saurashtra. Permanent settlements were established both in areas that had previously only been visited seasonally by pastoralists. Some communities shifted their home location from upland to plain, although the pastoral sector still

travelled seasonally between regions. This move must reflect the development among highland communities of the technology, knowledge, and confidence

Page 221
to exploit the new environmental zones offered by

the Indus Basin and to overcome their limitations. This was part of an enduring process, whereby pastoralists seeking seasonal grazing gained familiarity with new regions that later enabled their kin or other members of the community to move in and colonize these regions with permanent agricultural settlements.

In arid Baluchistan, dry farming was possible only in river valley bottoms, and water conservation was vital for high agricultural productivity. The inhabitants of many settlements built simple dams (*bunds* and *gabarbunds*) to impound or divert water that flowed off the surrounding higher ground in the spring when the melting of highland snows filled generally dry streams with seasonal torrents. This water could then be used for irrigation later in the year when temperatures rose and the ground became parched. As population increased, this technological expertise aided the settlement of new regions, made necessary by competition for the limited land suitable for farming in the arid highland region. The economic importance of cattle, the dominant domestic animal, also put pressure on arable land because they need to graze or obtain fodder from land suitable for cultivation, unlike sheep and goats, which can find adequate grazing in the scrub vegetation on uncultivated land. It is



Graffiti on terracotta vessels from pre-Urban Harappa; some scholars see it as an early form of Indus script



Pedestaled vessels such as this hand-built painted bowl-onstand of the Ravi Phase appear to be the predecessors of a vessel form that becomes more common during the later Kot Diji and Harappa Phases

possible that these economic pressures were increased by climatic factors, since some global data suggest that the fourth millennium was more arid than previous millennia and that this aridity peaked in the period around 3200-3000 BC.

Settlement in the Indus Basin was attractive because it offered a vast expanse of well-watered fertile land for arable agriculture and even wider expanses for grazing animals. Wild game, fish, and plants offered additional resources, and there were sufficient timber and plentiful mud for construction, as well as fuel for domestic and industrial activities. Unlike other foci of urban development, such as the Euphrates Valley, the Indus Basin and its environs were well-endowed with mineral resources, including flint in the Rohri Hills in Sindh, agate and carnelian in Baluchistant, gold dust on the upper Indus, and steatite, copper, and perhaps tin in nearby Las Bela and Chagai hills.

But the region had significant drawbacks too. Mosquitoes could carry malaria, and other fevers were also a feature of life on the plains. The jungle housed not only game such as gazelle and jungle fowl, but also deadly predators and dangerous wild animals, such as tigers, snakes, and the formidable elephant. The instability of the Indus was also a major problem, with the constant threat of floods and changes in the river's course. Existing technology, designed to conserve water, had to be changed and developed to deal with an excess of water.

This period saw greater variety in craft products in settlements than in earlier periods and growing regional diversity, particularly in pottery styles. Differences in the pottery from different areas suggest the existence of regional groups, some of which are linked to groups in Baluchistan, probably reflecting the links between highland and lowland maintained by seasonal transhumant pastoralists.

While this period is called Pre-Harappan by some scholars, the interchangable terms "Early Indus" or "Early Harappan" are generally preferred, because they reflect this period's cultural continuity with

the following Indus civilization. The study of this stage of cultural development is extremely important; not merely as a stepping-stone to urbanization, but also in its own right.

In the period from around 3200 to 2500 BC, five major and more-or-less contemporaneous traditions or cultural phases seem to have emerged in the greater Indus region, named after important sites:
1. Amir-Nal phase
2. Kot Diji phase
3. Damb Saadat phase
4. Kulli phase
In addition, there were a few other regional cultures that developed in the borderlands, the most important of which are the so-called Sothi-Siswal Phase on the northeast side of the Pakistan’s borders with India, Bagor Pastoral culture to the east, Northern Neolithic Phase to the north, and Helmand Cultural Phase to the northwest.

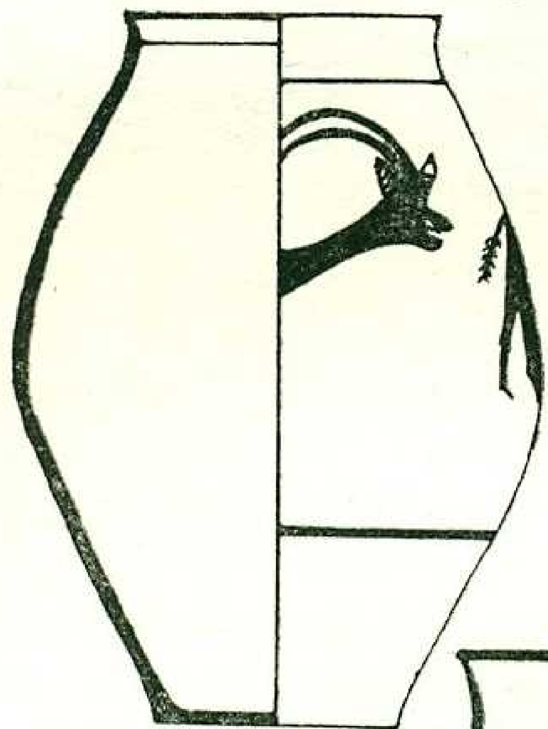
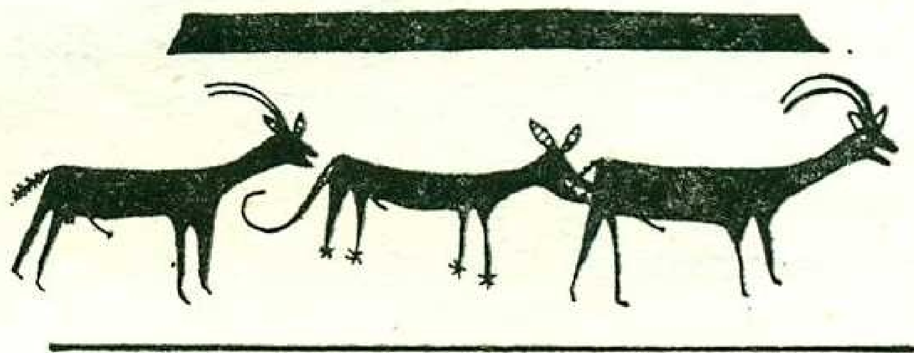
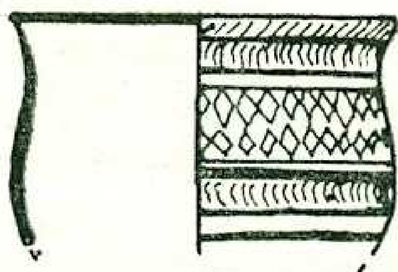
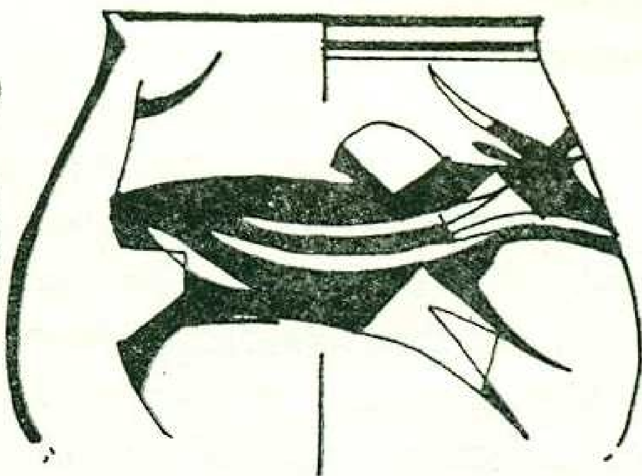
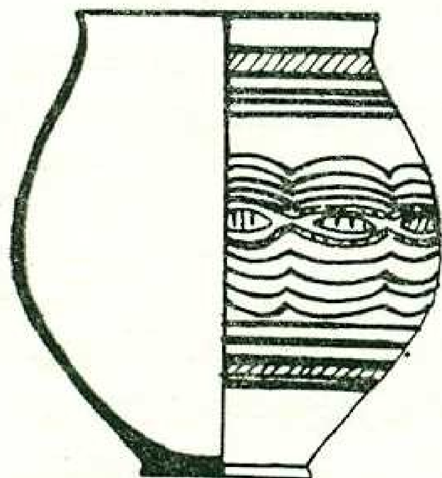
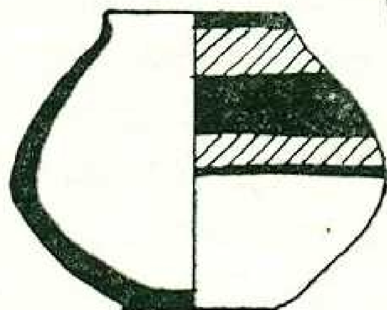
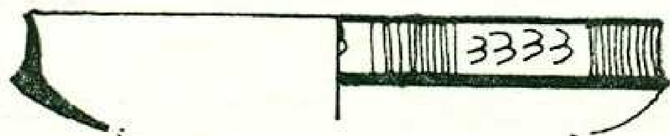
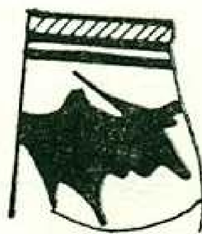
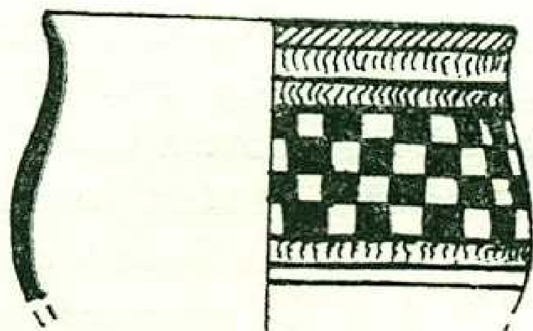
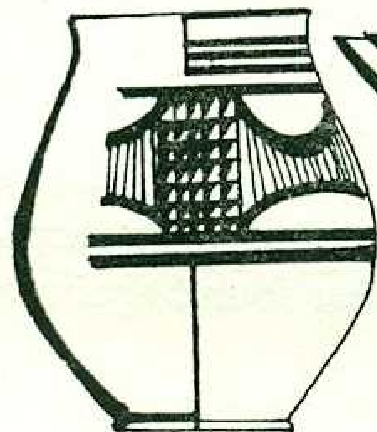
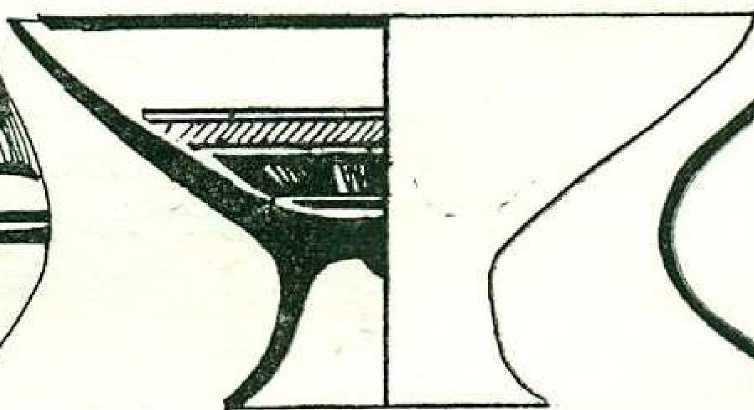
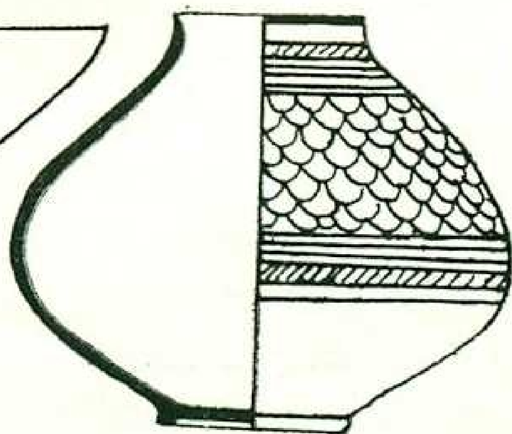
The Amri and the Nal phases are quite similar and they cover a contiguous area of the central and southeastern regions of Baluchistan and southwestern regions Sindh. They can, thus, be described and analyzed together. The Kot Diji phase is purely a riverine culture of the Indus plains and covers a large area from northern Sindh to the very north of the country. Kulli culture is generally considered as contemporary to the urban period of the Indus Civilization but its early periods can be safely assigned to the Early Harappan phase of which Damb Sadaat, Amri-Nal and Kot Diji cultures are part. It flourished in southern Baluchistan and has strong affinity to the Amri-Nal culture on one hand and the Kot Diji culture on the other. In its later manifestations, one observes quite a few similarities with the Mature Indus Civilization. Damb Sadaat phase is the hilly manifestation of the development of mature agricultural villages and towns in the Greater Indus Valley. It is concentrated in and around the Quetta Valley and spreading to the Kandhar region in southern Afghanistan as well as to Shahr-e-Sokhta region in northern Iran. The Zhob and Lorai valleys are considered under its influence and some archaeologists would expand its geographical area almost into the Kalat plateau.

Amri-Nal: Amri-Nal sites are known over southern Baluchistan, including the Makran region and southwest Sindh, but few have been excavated to any great extent. The Amri culture belonged to the western fringes of the Indus plains while the Nal culture has been strong in southern and central Baluchistan up the hills to the area of Jhalawan. Both of these cultures, as judged by their pottery, painting, and other artifacts, are quite similar. The artifactual styles are often influenced by each other and some of the sites have the remains of both. Thus, we are treating these two regional cultures as one, basically a southern manifestation of settled agricultural life.

There are several characteristics of the AmriNal phase of the Early Indus period. First, the pottery of this phase is very fine and superbly decorated in bichrome as well as in polychrome colors. In fact, the Amri-Nal pottery is the finest and the most beautiful that the Indus Age has ever produced. Second, the agricultural settlements of AmriNal phase have been in profusion, mainly in southern Baluchistan but also up in the hills up to Khuzdar on one hand and in the plains around the Manchar Lake on the other. Third, the Amri-Nal settlements generally do not have earlier habitation although quite a few of them do show the later habitation of the Mature Harappan times. Fourth, almost all the housing structures that have been excavated have a solid stone plinth on which walls of mudbricks have been erected. This building style, although in evidence prior to this phase, continued for a long period to come almost all over the southern part of Pakistan and this seems to be a legacy of the Amri-Nal phase to the Mature Indus Civilization.

Probably the most significant, the Amri-Nal phase stands out, at least in archaeological terms, for its water management. It appears that the use of various types of dams was common wherever such dams could be built. This practice is significant not only from the perspective of the social cohesion, collective confidence, and engineering skills of the people but also from the perspective of history. The Mature Harappan Civilization, that followed this phase, is known for its water management. It is probable that Amri-Nall phase had something to do with the transmission of dam building technology to the peoples of the mature Indus Civilization.

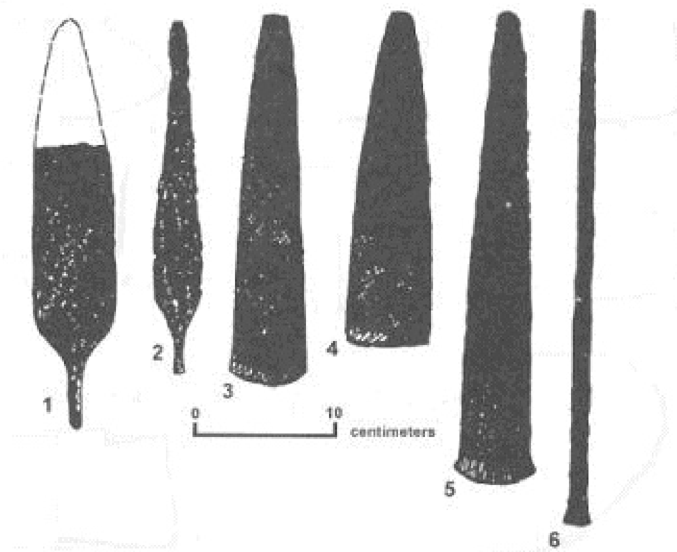
Finally, the extensive practice of irrigation by

Representative pottery from Amri Phase

the people of southern Baluchistan strongly indicates that some summer crops, such as *jawar* and *bajra*, were being produced. It is known that these food grains originated in Africa and got transmitted to the eastern fringes of the Iranian plateau quite early on. The people of south Baluchistan were in a position to acquire these crops through coastal boating along the Persian Gulf or through the land route across the Iranian Plateau. If it is true, then this Early Harappan phase must have contributed to the creation of food surplus on which the Indus Civilization arose. As far as the domesticated animals go, there is strong archaeological evidence for the presence of domesticated goat, sheep, cattle, and water buffalo. Hunting was concurrently practiced as the bones of wild goats, gazels, and mountain sheep have been found at some sites. There is, however, no clear evidence for fishing or making use of any sea food..

Amri-Nal pottery and pottery paintings as well as other artifacts, such as terracotta figurines, show a strong affinity to the Quetta Ware that prevailed earlier along the pastoral and trade routes all over Baluchistan. This affinity is, however, not universal: it is more so in the hills than at the fringes of the Indus plains. This pattern indicates a general patEarly Indus—II!



Nal, Copper-based implements (*after Hargreaves*)

Copper implements from Nal (*after Hargreaves***)**
tern of regionalization but at the same time shows Valley and at Anjira I. There is, however, e considerably intimate inter-regional contacts.
vidence for the next period, that is the KulliThe archaeological findings at southern sites of Amri-Nal phase show the emergence of the Kulli
culture, mixed with the Nal influence. The
culture in the later part of the Amri-Nal phase. The

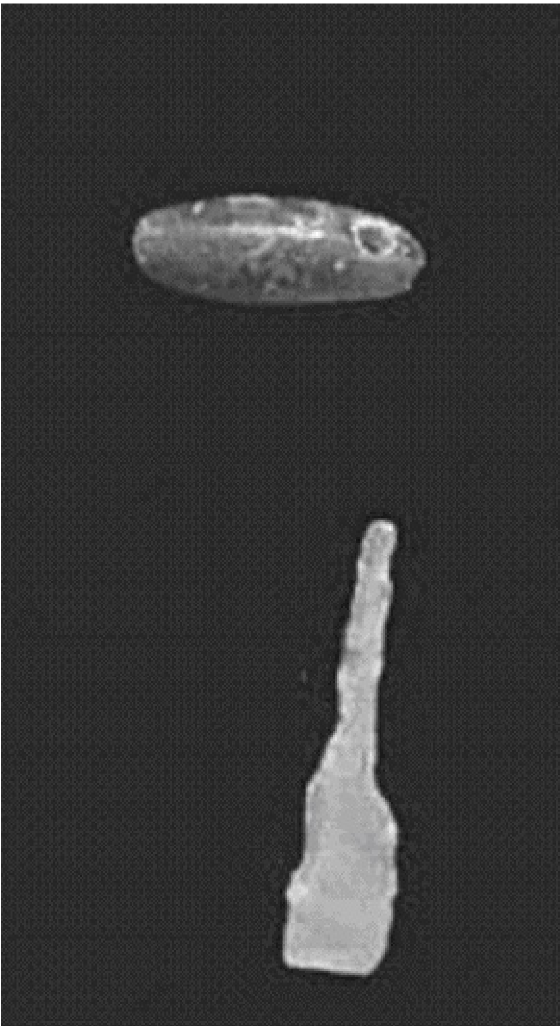
Hab Valley Surrounding Southeast of Khuzdar sites in Karnach valleys, Kolwa, the Wadh., and the area to its north. These sites have several things in common. First,
evidence occupation of

represented in the Quetta
wide distribution of the Nal-type

settlements includes for the first time at the low-lying alluvial plains of the southern Indus River Valley, or western Sind, and the district of Las Bela.. De Cardi has noted Nal pottery well down toward the Mula Pass in the Mula River valley at Jahan. At larger sites of Judeirjo-daro near Jasckobabad in southern Kachi, Raikes found ceramic material suggesting Early Harappan occupation there that included a canister of Nal type as well as a number of sherds with painted designs familiar to the southern Baluchistan culture. De Cardi also



found similar material at Pathiani Kot at



A camelian bead abd a drill, Adam Buthi, Las Bela

Polychrome Nal pottery from Niai Buthi, Las Bela , Baluchis
the foot of the Mula Pass.**tan**
The archaeological area of the Hab Valley
Kulli culture is believed to thrive contemporaneously
has been extensively surveyed by Joint
with the Harappan Civilization and is generally con

sidered as the hilly manifestation of a riverine civilization. It can also be considered as a product of the Early Indus culture of the Amri-Nal phase. Amri-Nal phase gave way to the Harappan Civilization but in some areas the local Kulli culture survived for a long time into the Mature Indus Civilization.

Several Amri settlements are located close to rivers and streams near their point of debauchment onto the flood plain of the western Nara and Manchar Lake system. Some sites are close to hot springs (Ghazi Shah, Damb Buthi). These sites are representative of small villages where inhabitants built house walls of mud brick often set on boulder foundations. Often these villages were located on spurs or hillocks above what had once been cultivated area (Damb Buthi, Naig, Chauro) but majority been recorded.
are found in the low area at the foot of the hills or Early Indus—II**!**The miscellaneous cultural material recovspurs (Ghazi Shah, Gorandi, Pandi Wahi). Several

sites, in fact, were located directly on the Lake
ered from the deposit forms an impressive list: copper adze, saw, chisel, knife, seal with a holed lug

on

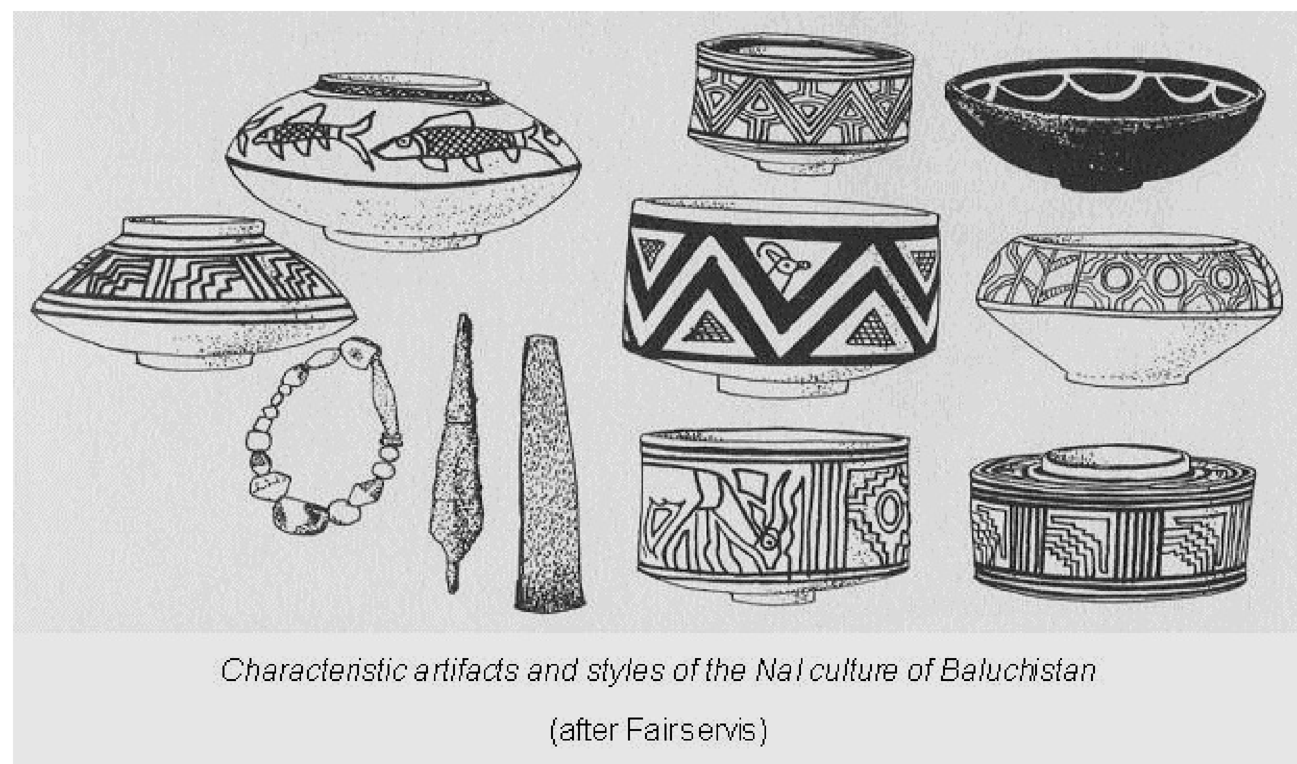
Manchar plain. The site of Lohri, for example, isPioneers. Some of these finds went to the Quetta Museum which was later

inundated annually and for a large part of the year a celt made of quartzite, limestone weights, balls, is just above water-level.

destroyed in the disastrous earthquake of 1935. In 1923 the Bizanjo Sardar of the

grinding stones, marble ring stone and disc, bone

m – was found full of burials which comprised mostly fractional burials in pots but had a few complete graves in defined graves as well. For example, an infant's grave was found in a small chamber made by setting mud-bricks on edge, and the grave goods included 16 beads and a crystal pendant. A complete burial of an adult showed a grave where the body lay east- west, set on the left side, with the legs bent. There was no grave goods here, just as there was no grave goods in another infant burial. Complete burials without defined graves have also


Characteristic artifacts and styles of the Nal culture of Baluchistan (after Fairservis)

Characteristic artifacts and styles of the Nal culture (*after Fairservi*s)
Nal is a prominent village about 40 kilometers west of Khuzdar in Jhalawan. It is located at a disc and worked fragments, cattle figurines, and a large number of beads made of crystal, agate, carcommunications node and has a point of settlement

region excavated more pottery. It was broken in transport to Quetta. This led

nelian, paste and lapis lazuli.
for many millennia. There is an archaeological site

A number of new settlements appeared dur

Hargreaves to conduct a systematic excavation in 1925. These diggings pr

about seven kilometers to the east of the present ing this period in Gujarat. These may include Dho

village. This is Sohr Damb, which is a very promioduced evidence for fractional burials, some of which were concentrated in

nent feature of the landscape. More importantly,

between Khuzdar and Nal, forming the apex point ofassociation with the beautiful Nal

a triangle linking these three places, is Sekran

funerary pottery. Three completewhere there are extensive traces of old lead and

antimony mining. Pre-industrial lead-smelting is also

burials in brick lined graves were

reported from the area.

found associated with architectureAs a site, Nal covered about 5 hectares and

was systematically excavated in 1925. The exca

and other classes of material,vated area was designated Area A, where two kinds

of structures, one utilizing the boulders of a local

pottery, figurines, beads and the

river bed and the other using large quarried stones

like. He from the neighboring hills, were noticed. Otherwise,produced a fair also

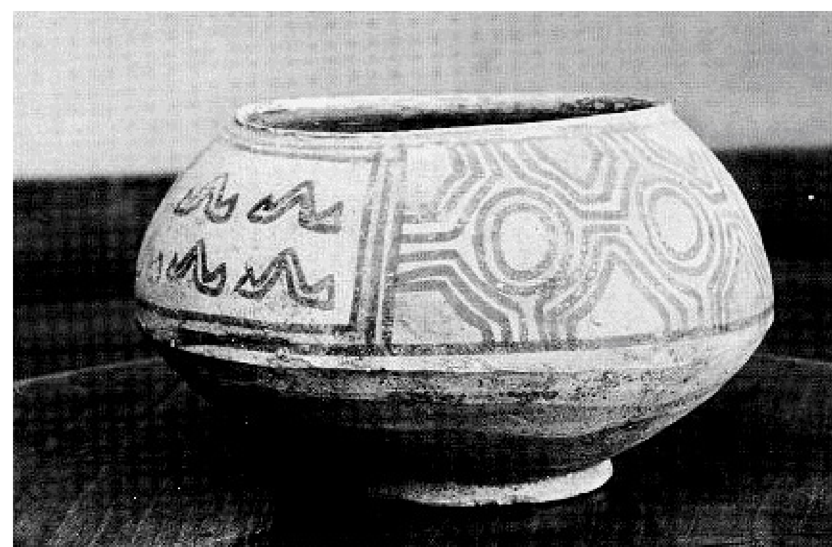
the whole area – all of its occupational depth of 1.2 earliest levels of occupation contain pottery that

may belong to the Amri-Nal tradition. A number of these sites were located on or near the seacoast. This period saw a general increase in coastal settlements, including a number in Makran. Some of the latter did not have Amri-Nal materials but an assemblage known as Dasht.

Except for Balakot, there are almost no remains of plants and animals that have been described from

the Amri-Nal sites. There is a small report on the faunal remains from Amri. It documents a pattern that is recurring at other sites, with an abundance of cattle bones and some sheep and

number of copper implements. The **104**
site of Sohr Damb near Nal has been subjected to four campaigns of


Nal pottery with concentric designs

(National Museum, New Delhi)

goats. Bones of Sindhi crocodile, rhinoceros, and wild ass have also been found. The villages along the piedmont of Baluchistan were placed to take advantage of the hill torrents or *nais* and the natural springs that dot the outer face of the mountain front. Lake Manchar, the natural inundation basin of the Indus, was extensively utilized as an environment to be directly exploited for marine food and a huge, naturally irrigated farming tract, resulting from the seasonal expansion and contraction of the lake waters. This is documented at a site of Lohri, for ex

ample. Early Indus—III! erate actions in his quest for bringing the rich allu

Kot Diji Phase: Kot Diji is the most expansive
of all cultural phases described in this section. In

Kot Diji Phase fact, if any cultural phase can be designated as the

one single precursor of the Harappan Civilization, it
would be the Kot Diji culture. Just like other cultural

vial land under cultivation. Under these forces, it is natural that we do not find as many preserved archaeological sites in the alluvial plains as those in the arid or semi-arid zones that escaped the deposi

tion of alluvium, destruction under inundations, and

Kot Diji phase covers the geographical area of Pakistan that spans from the

pure form anywhere except perhaps at very few This applies especially to the Kot Diji sites

northern part of the present-day Sind province right up to as far as the Pothowar

sites. Similarly, the geographical boundaries, al because this phase was largely riverine in nature.

blurred and These villages most likely thrived in the Indus plains dence. For example, the Early Harappan sites in the Cholistan Desert outnumber those in other parts of Pakistan, including those in the alluvial plains of the Indus and its tributaries. Similarly, while one finds several settlements on the western edges of the Thal Desert, such as the district of Mianwali, we do not find any trace of the Early Harappan settlement in the alluvial plains of Punjab.

This anomaly stems from the disappearance of the Indus villages under the alluvium of the rivers, destruction of sites by inundations and man's delib

though easily discernible, are quite

plateau. Its area of influence also

fuzzy. It takes its name from a type
site of the same appellation.

extends to the east of the Indus

Kot Diji sites are known in
central
and
northern
Baluchistan

of which Cholistan seems to be

and Cholistan, and more scattered

the center. Although a reverie

Swat, and in Sindh, including Kot

culture, the Kot Diji is at home in

the Indus flowed at that time, and

western

Jhukar further west. A few Kot Diji

foothills of the

sites are known in Sindh Kohistan,

country, from Dera Ismail Khan

Nal sites, and some settlements

to Bannu and Peshawar valleys.

parts of Cholistan, the sites related
to
this
period
found

As stated before, Kot Diji is the

during field

most

surveys seem to decrease in num

expansive of allber and increase in size, suggestcultural

ing greater permanence of settle

phases described in the previous

ment as farming villages replaced

chapter or to be dealt with in the

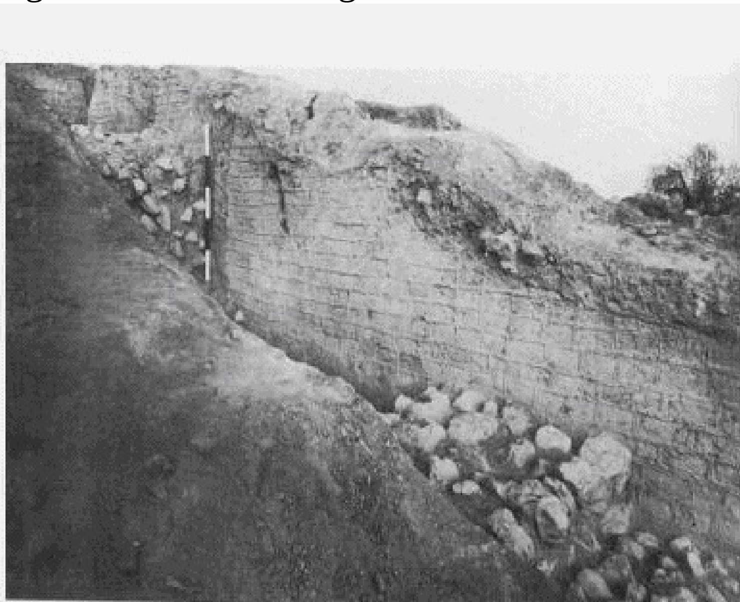
listan sites has been excavated, so

present one. In fact, if the information available from them any

is limited. Kot Diji settlements have

cultural phase can be designated

region and on the fringes of the Thal


Kot Diji, stone foundation and mud-brick superstructure

(*Pakistan Department of Archaeology*)

Kot Diji, the High Mound circumvolution showing stone foundations and mud brick superstructures

Kot Diji, stone foundation and mudbrick superstrucas the one single precursor of

Jhelum. Although a reverie culture,

Indus Civilization, it would be the Kot Diji phase. Just like other cultural phases but apparently vanished to escape our detection for

country, from Dera Ismail Khan to Bannu and Pesome of the reasons mentioned above. The sites of

of the Early Indus, the Kot Diji is not found in its pure form anywhere except the other cultural phases, such as the Quetta Valley,

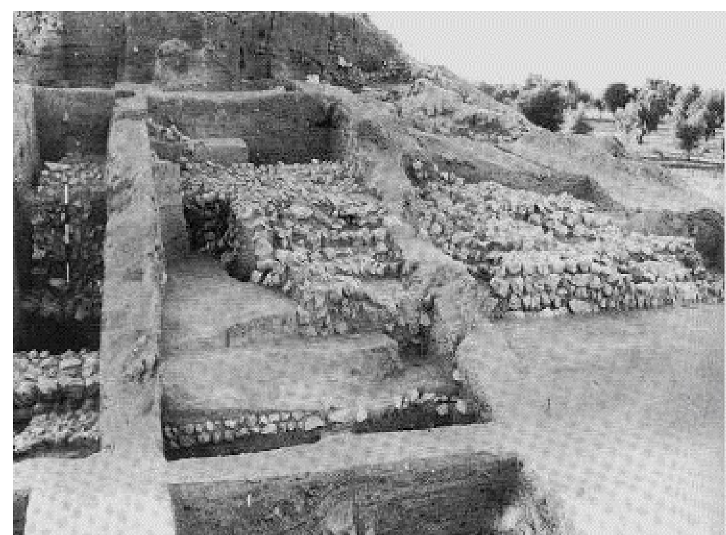
The epicenter of Kot Diji culture seems to be Amri-Nal, and Kulli, were largely situated on the

perhaps at very few sites. Similarly, the geographical boundaries, although

easily slopes of the hills and in the valleys of Baluchistan

the middle of the Indus plains. However, these allu

vial plains are rather poor in archaeological sites, the Kot Dijian or otherwise. Contrarily, a large num ber of sites, have been found in semi-arid regions, such as Cholistan and Bannu, or on the foothills of the western and northern mountain ranges, such as Gumla, Rehman Dheri, Sarai Khola, etc. This anomaly in site distribution has created a lot of con fusion in the interpretation of archaeological evi



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mountains, and the chance of their survival was

discernible, are quite blurred and much better. In short, the apparent sites density of

the Kot Diji cultural phase as well as that of the In

fuzzy. It takes its name from adus Civilization should not be equated with the

population density in the Early Indus period and

type-site of the same appellation.beyond. Possehl has well emphasized this point in
his *Indus Age* (1).The geographical area covered by

Kot Diji pottery - fine red or buff ware with black painted decoration - bore some similarities to

the Kot Diji phase is large. We
shall, however, confine our discussion only to a few typical

that of Amri. However, many of the vessel shapes were different, and the decoration on Kot Diji pottery included a number of distinctive elements, such as floral motifs, a fish scale pattern, and a "horned deity" (a head with enormous buffalo horns). The range of Kot Diji vessels included large porous water containers with grooved surfaces (Bhoot Ware). Another class of pottery, Wet Ware, common to both Kot Diji and areas of Baluchistan, was also probably used to store water. The characteristic appearance of these was achieved by applying a thick slip that was then partially removed with a damp cloth, leaving a rough, cloth-patterned surface. The pottery uncovered in the early deposits at Harappa show a clear line of development from the Ravi to Kot Diji styles.

Kot Dijian, while having its local aspects, sometimes appear to be a variant on the Amri-Nal cultural type, whose remains have been described in the above. The often exuberant painted designs familiar in Baluchistan and southern Sind are rare here, but in general the equivalences are more than casual. There are also some analogies to material from the Quetta sequence, including potters' marks.

A number of Kot Diji sites were of substantial size, including Rehman Dheri in the Gomal Valley, which had a wall built of clay slabs, possibly entirely surrounding the 19-hectare settlement although it has been traced only in one part. The houses there were also built of clay slabs, which were locally available as a building material, being cut from dry riverbeds. Some houses were circular, others rectangular. In the early phase of settlement, houses contained silos for storing grain, while in later phases storage jars were used.

Kot Diji is a splendid small site on the national highway linking Hyderabad to Sukhur. It is situated on the old alluvium of the Indus Valley, below a huge Talpur fortress, adjacent to the Rohri Hills, a key source of high-quality flint that had been exploited since Paleolithic times. The Pakistan Department of Archaeology conducted an excavation there in 1955 and 1957 under the direction of F.A.Khan. An analysis of the site was one of the primary foci of M.R.Mughal‘s Ph.D. Dissertation (2) and he created from it the “type site” for his Early Harappan period. There are two periods separated by a burnt level. The burning was found everywhere and represents a large scale conflagration which seems to have enveloped and destroyed the entire settlement.

Gumla is another site with substantial Kot Diji cultural remains. Period II of this occupation has a wide range of painted wheel-made pottery, some with ‘Quetta ware’ designs and some with ‘Kot Diji’ forms. Microlithic tools, a limited amount of copper and bronze and terracotta bangles, toy carts and cattle and female figurines make up the artifactual horizon of Gumla during this time period. Period III is dominated by Kot Diji pottery forms and designs and the appearance of a new terracotta female figurine style, but otherwise there is continuity of occupation. Period IV belongs to the Harappan Civilization, mixed with Kot Dijian artifacts and pottery.

No complete building plans are available from Kot Diji phase but fragments of mud bricks have been recovered. A wide range of other implements is present, including three copper artifacts, beads, bangles, ground and chipped stones and figurines. One conch bangle indicate some long distance trade or exchange. Period III seems to have come to a violent end, with an ash layer separating the two occupations. There is, however, a remarkable degree of cultural continuity between the two occupations.

Late Kot Diji Phase of Gumla, Gumla IV, is the most flourishing period in the life of Gumla village. Mud bricks of the same size as Period III are common and a few baked bricks of 11x5x21/2 inches were located on the surface. The ceramics can be classed with the Late Kot Diji assemblage found

elsewhere, especially in Bannu (Tarakai Qila, Lewan) just to the north of the Gomal Plain. At Gumla this includes perforated ware, akin to Urban Phase Harappan type. A range of other artifacts that would be associated with Mature Harappan was also discovered in Gumla IV. Dani note the finding of an etched carnelian bead, a cubical stone weight, a faience button or seal, steatite-paste disk beads, toy cart frames with wheels, and triangular terracotta cakes.

Rehman Dheri is a much larger site in the Gomal valley. This important site was discovered by A.H.Dani in the course of his 1970-71 exploration of the Gomal valley. The site is about 20 kilometers northwest of Dera Ismail Khan. It was a large settlement and in a splendid satte of preservation, but Dani's work at Gumla and Hathala did not allow him to undertake excavation at the time of discovery. The excavation work was handled by his colleagues at Peshawar University who definitely did not do a good job. Dani was able to renew the excavation at Rehman Dheri in 1991 but the site was already messed up by the inexperienced students and their teachers.

Rehman Dheri is basically a Kot Diji culture site, showing an increasing number of Kot Diji pottery forms and designs culminating in some Indus civilization examples. Otherwise, the site is fortified right from the beginning, with a 1.2 m wide mud and mud-brick wall resting on a 1.8 m wide foundation wall of the same material. Wheat, barley, fish and domesticated cattle, sheep and goat complement the subsistence picture.

The first two occupations of Rehman Dheri have been assigned to the Kot Diji Phase. Individual rooms were found for Period I, defined by walls formed from mud slabs. Based on ethnographic observations, these slabs or blocks were taken from dried up water courses and formed into house walls. This is an unusual form of construction, not noted elsewhere in the Greater Indus Region. Both grain silos and hearths were found in these rooms. The grain silos seems to disappear, to be replaced

106 in function by large storage jars. The hearths were of two types: circular and rectilinear. A unique ivory pendent was found in Period I. The architecture of Period II shows signs of continuity out of Period I.

The only relevant excavation in the Pothwar region is Sarai Khola whose Period I has ground stone celts, terracotta wheels and toy cart frames, microlithic tools, bone points, hand-made pottery with basketry-impressed base, and no metal. The transition period II was gradual, hand-made pottery being replaced with wheel-made type.
wan there is only a series of excavated pits without any clear architectural association. Otherwise, however, Lewan gives the impression of being a production site of stone objects like querns, mullers, ground stone artifacts, etc. Islam Chowki is interesting for the evidence of a damaging flood during its prehistoric occupation which has among other things sheep, goat, cattle, wheat and barley. Lake Largai had, in addition, bones of rhinoceros. On the whole, the Bannu basin offers an uninterrupted se

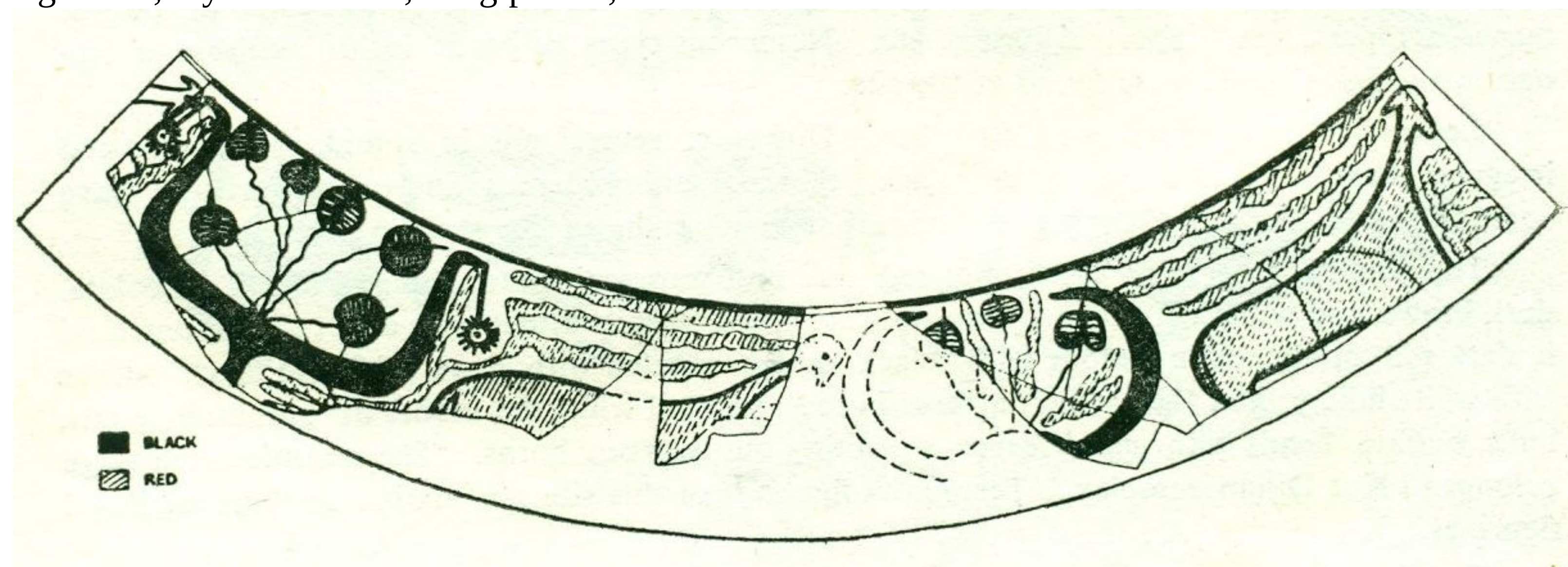
An example of this kind is a red jar with
a short neck and a large elliptical body,
and painted black at the neck and Early Indus—III!
shoulder. This is a typical Kot Diji form,

more of which has been found in this

indeed located in the Indian Punjab, Haryana, and along the dry riverbed of the period, along with some

copper, terra
cotta and shell bangles, microlithic andepicenter is established, then the
ground stone artifacts, terracotta cattle

expansion of the Indus Civilization necessarily takes an east-to-west direction.
figurines, toy cart frames, sling pellets,



Quite a few western scholars have also fallen prey to this trendy fashion, overlystone beads, etc. There is no radiocar
emphasizing the site distribution in the arid zone and the Gaghar-Hakras riverbon date but Period II should belong to
the second half of the third millennium **Painted motif on pottery from Gumla IV: Late Kot Diji Phase.**
BC.bed without explaining the reasons why, and renaming the Gaghar-Hakra river
as the 'Sarasvati' without suspecting that it would soon be transformed into the



A Kot Diji vessel. Note the horned head of a buffalo. It is a common theme in the Kot Diji Phase as well as the Mature Harappan period.
(*Pakistan Department of Archaeology*)

undoubtedly **A Kot Diji vessel. Note the horned head of a water buf**A Kot Diji vessel. Note the horned head of a buffalo.
the
falo. It is a common theme in the Kot Diji Phase as well
It is a common theme in the Kot Diji phase as well
as in the Mature Harappan period*Pakistan Depart*
ment of Archaeology)
agricultural The 70x80 km sedimentary basin of Bannu is
villages first developed in that part of Pakistan. Furthermore, all the knownsurrounded by hills on all sides, with the high moun

tains on the Afghan border on the west and north
urban centers have been discovered in the Indus Valley. The villages situatedwest. The Kurram and Tochi rivers provide the per
around these urban centers, obviously, cannot be fewer in number than those ennial drainage and some major communication

lines with Afghanistan, and although vegetation at
situated at their perepheries. Looking from another view, the arid zones cannotpresent is highly degraded, what has been sug
be thought more densely populated than the fertile plains of the Indus.gested for Baluchistan may also be suggested for
Bannu.
This anomaly stems from the disappearance of the Indus villages under theThe third millennium BC

levels in Bannu are

alluvium of the rivers, destruction of sites by inundations and man's deliberate associated with the Kot Diji culture of the plains and
have been excavated at Tarakai Qila, Lewan, Islam
actions in his quest for bringing the rich alluvial land under cultivation. Under Chowki and Lake Largai, all in the Tochi-Barab

these forces, it is natural that we do not find as many preserved archaeologicalarea. At Tarakai Qila, mud-brick architecture with
massive walls in places has been found along with
sites in the alluvial plains as those in the arid or semi-arid zones that escaped the wheat, barley, lentil and field-pea, whereas at Le
quence of village occupations right from the middle of the fifth millennium BC to 3000 BC. of Jalilpur is a small Punjabi village with a large

Early Harappan site. Located 75 kilometers southwest of Harappa. The site covers an area of almost 13 hectares. It was excavated by M.R.Mughal of

to
the

Pakistan Department of Archaeology in 1971. The material collected indicated that it had Kot Diji pottery. An early occupation turned out to be of Hakra Ware. Since it is the only excavated site of the Hakra Ware Phase, the importance of Jalilpur lies in

of
Indus

the understanding of the Early Harappan through Hakra Ware Phase. The transition from Period I (Hakra Ware) to Period II (Kot Diji) at Jalilpur is not abrupt. There is a gradual change of ceramic inventory. Two structures of mud brick and mud lumps were recorded in Period II. The material inventory of Jalilpur II includes triangular terracotta cakes, toy cart frames, cart wheels, human figurines, bull figu as the Mature Harappan period (rines, bangles, beads of terracotta, agate and carnelian; pestles, and copper pieces.

The densest distribution of the Kot Diji phase sites is not in Sindh, where this phase was identified, but in Cholistan. Here 40-odd sites share a slightly different but overlapping area of distribution with the sites of the Hakra Ware phase. According to Possehl (1), there are fifty-one Kot Diji sites in Bhawalpur and the Desert of Cholistan. The preceding Hakra Ware Phase documented the presence of nomadic and semi-sedentary peoples, but by the Early Harappan this changed. Village farming communities predominate, and while site counts drop in this area, the presence of Kot Diji occupations is strong and deep. Gaghar-Hakra river would have flooded seasonally. The history of this braided river system shows that it terminated in an inland delta in the Cholistan. Flooding would have renewed grass

deposition of alluvium, destruction under inundations, and a lack of economic 107 development in the area. This applies especially to the Kot Diji sites because

this phase was largely riverine in nature. These villages most likely thrived in the

The only relevant excavation in this region is Sarai Khola whose Period I has ground stone celts, terracotta wheels and toy cart

Harappan Civilization - The Material Culture

Early Indus—III!
lands as well as fields. The apparent increase intools, bone points, hand

village farming communities should not mask the

made pottery with basketry-impressed base, and no metal. The transition period II was gradual, hand-made pottery being replaced with wheelmade type. An example of this kind is a red jar with a short neck and a large elliptical body, and painted black at the neck and shoulder. This is a typical Kot Diji form, more of which has been found in this period, along with some copper, terracotta and shell bangles, microlithic and ground stone artifacts, terracotta cattle figurines, toy cart frames, sling pellets, stone beads, etc. There is no radiocarbon date but Period II should belong to the second half of the third millennium fact that vast reaches of this environment wouldThe Pothowar Plateau: The only relevant excavation in this region is Saraihave been prime land for cattle keeping peoples, living in symbiosis with agriculturists. No site has Khola whose Period I has ground stone celts, terracotta wheels and toy cartbeen so far excavated.
frames, microlithicAbout 70 km to the northeast of Jalilpur along

the alignment of the Ravi is Harappa where the ex

cavations have identified two periods of Kot Diji ocmade pottery with basketry-impressed base, and

cupation (3). Period I - mud-brick walls, Kot Diji re

lated pottery, terracotta bangles and female figuno metal. The transition period II was gradual,

rines, a frequent blade industry and rare polished

celts, and beads of lapis lazuli, carnelian and steain this hand-made pottery being replaced with wheelstreamtite - has been traced at the north-northwestern

settlement hasedge of the mound E at the site. Period II - massivemade type. An example of this kind is a red jar

mud-brick perimeter walls with a few structural

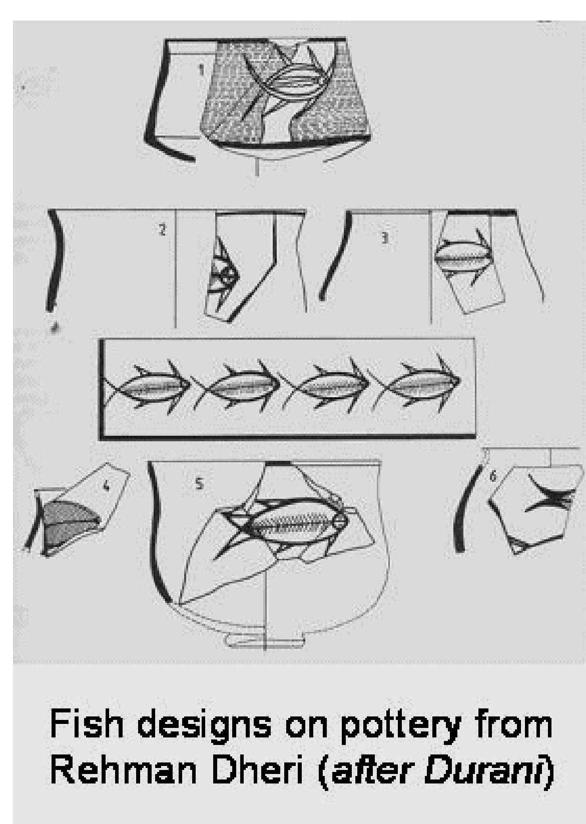
walls on one side, the inner wall with a short neck and a large elliptical body, and

tiles, etc. and a systematic lay-out of habitational

areas along a major north-south street - has beenpainted black at the neck and shoulder. This is a

traced both in this section and along the southern

typical Kot Diji form, more of which has been found in this period, along with some copper, tools, bone points, hand

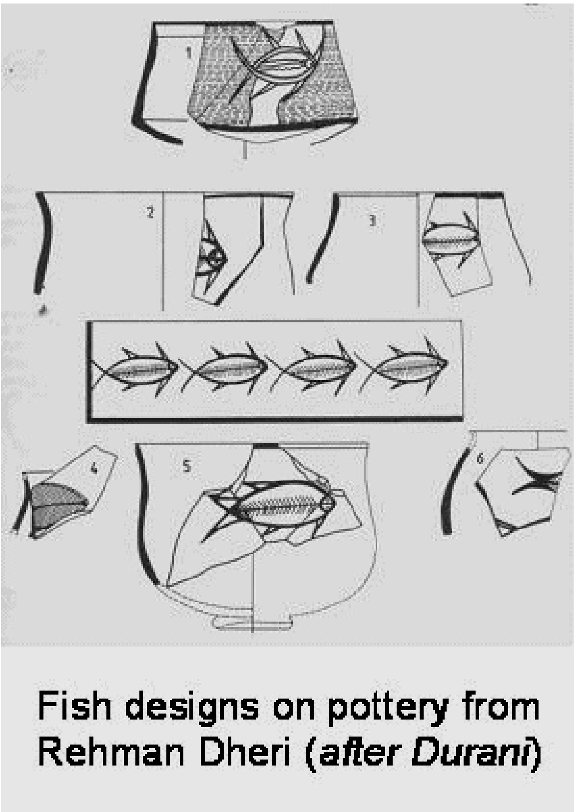


Fish designs on pottery from Rehman Dheri (*after Durani*)

terracotta and shell bangles, microlithic and

Fish designs on pottery from Rehman Dheri (*after Durrani***)**

ground stone artifacts, terracotta cattle figurines,


Fish designs on pottery from Rehman Dheri (*after Durani*)

toy cart frames, sling pellets, stone beads, etc.

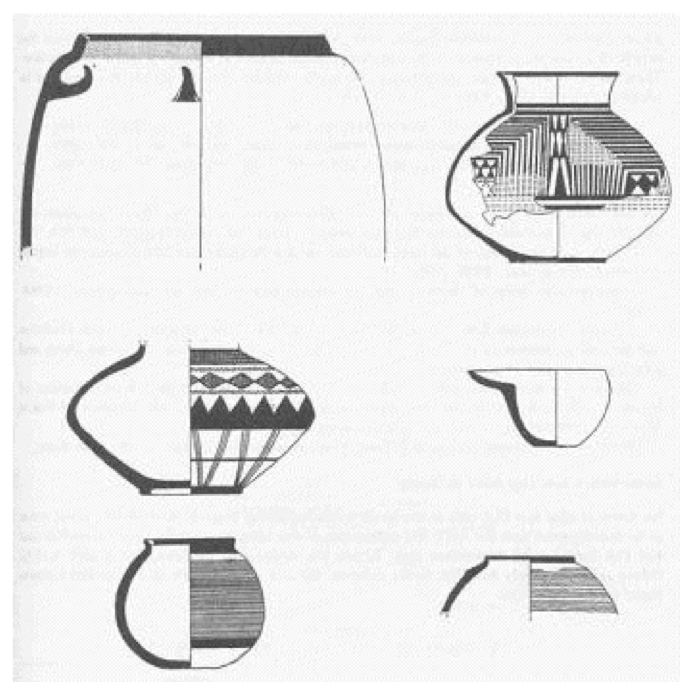
edge of the mound. The Period II settlement covered more than 13 hectares.

There is no radiocarbon date but Period II should That the Kot Dijian variant of the Early
The 70x80 km sedimentary basin of Bannu is surrounded by hills on all Harappan occupancy of the Indus Valley is not a sides, with the high mountains on the Afghan border on the west and northwest. belong to the second half of the third millennium

unique matter is indicated by the finds of a comparable pottery from the pre-defense deposits found

BC. The Kurram and Tochi rivers provide the perennial drainage and some major

by Sir Mortimer Wheeler at Harappa. The important fact is that the presence of this settlement so far



Early Indus pottery in Cholistan
(*after Mughal*)

into the Punjab strongly suggests that a rapid diffu communication lines with Afghanistan, and although vegetation at present is sion across the fertile Indus plain was in process

Bannu:

The 70x80 km sedimentary basin of Bannu is surrounded by hills on all

before the Harappan period. Evidence for this phenomenon has been accumulating.

sides, with the high mountains on the Afghan border on the west and northwest.

The Kot Dijian town at Harappa had trade

Baluchistan may also be suggested for Bannu: The Kurram and Tochi rivers provide the perennial drainage and some major

in the central Indus and shell collectors of the dis

there is no clear evidence of climate change communication lines with Afghanistan, and although vegetation at present is Early Indus pottery from Cholistan (over the past few millennia. Irrigation is ian and agate, lapis lazuli and steatite, were imhighly degraded, what has been suggested for practiced along the river courses but drylong distance trade go back almost to the Early SetBaluchistan may also be suggested for Bannu: farming areas depend more on pastoralism thanthe borderlands in the west but it is possible that the there is no

clear evidence of climate change on agriculture. Of all the sites excavated in the Indus plains, acquired some raw materials from the
over the past few millennia. Irrigation is
region, Sheri Khan Tarakai, located on the bank however, been forthcoming for this possible ex
of a non-perennial stream of the Tochi system,practiced along the river courses but dry



Carved ivory pendants from Rehman Dheri (*after Durani*)

is the most antiquity and the clearly documented details of cultural remains. The calibrated

Carved ivory pendants from Rehman Dheri - Kot Diji phase (*after Durrani***)**
We know several Kot Diji sites in the Sindh

farming areas depend more on pastoralism thanimportant,ceramics on the surface. Others are more Kot Dion agriculture. Of all the sites excavated in the

Phang and Kohtras Buthi on the Baran Nai. Kohtras

region, Sheri Khan Tarakai, located on the bank

single occupation site, and belongs to Kot Diji

of a non-perennial stream of the Tochi system,
stone foundations were common, alongis most extent of the Kirthar Range, above the alluvial
108the most important, with and because of itssaddle querns and mullers, ring-stones, groundboth
antiquity and the clearly documented details of cultural remains. The calibrated celts,

microlithic stone tool industry, bone tools, occasionally painted terracotta bull date range is c. 4500 —3000 BC.

plain of the Baran Nai. The site has the remains of two stone walls, below the settlement, the walls were possibly defensive, since they effectively protected the vulnerable flank of the settlement. The site of Phang, also on Baran Nai, is much smaller and is associated with a gabarband. It too is a

group consists of largely of
purely Kot Diji site.

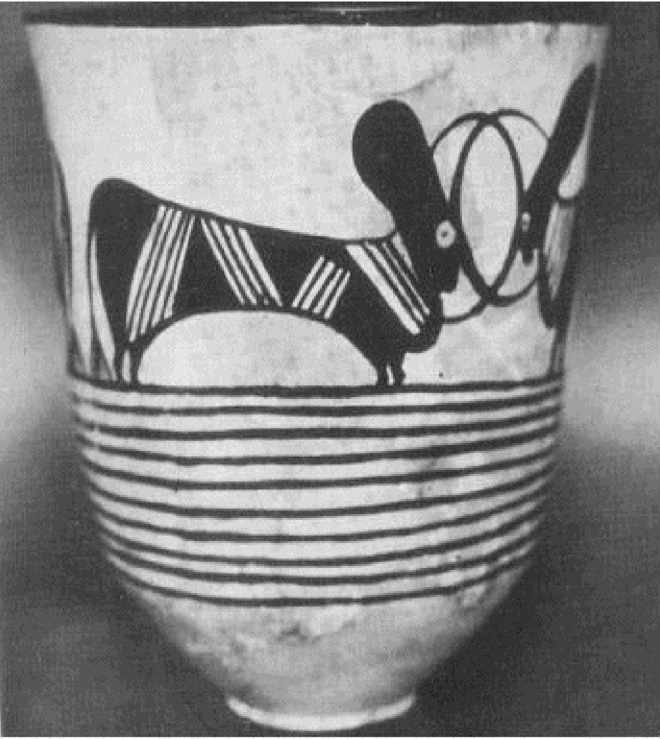
delicately modeledAn other interesting area of Kot Diji settleterracotta pieces an inch orments is District Mianwali, especially at the edge of somewhat more in size. Thea water stream in this region. The settlement has figures are full breasted andtwo successive walls on one side, the inner wall distinguished by thebeing three to four meters high, made of stone.

depiction of heavyAlthough this area is near Bannu, very little similarnecklaces and strands of ity in the artifacts has been noticed. It appears thathair reaching to the top of the Mianwali settlements are more 'Kot Dijian' thanthe breasts and made by thethose in Bannu area. Apart from a general survey appliqué methods. The legs and surface exploration, no archaeological work has are bent forward at the knee
yet been undertaken.
and are footless and end in a

Damb Saadat: Contemporary with the Amrirather grotesque tapering Nal, the Damb Sadaat is a small, more localizedfashion.cultural phase of the Early Harappan in northern The second group of object and central Baluchistan, centered in the Quetta Vals is that of the potters' ley. It rests on a long history of occupation in this marks. These first occur asfertile, well-watered valley. Quetta-Pishin is blessed early as the first phase of thewith substantial subsurface water resources, availKechi Beg ware (see the able even to relareferred to as Dasht tradition. Across the Khojak Pass, it is found at Said Qala and Deh Morasi Ghundai and then Mundigak. A ceramics variety occurs in Siestan, principally at Shahr-e-Sokhta. This distribution has an interesting funnel-like shape, with Quetta-Pishin at the base and the narrow neck projecting down the Bolan Pass to Kachi and the Indus Plains. The cup of the funnel hold Siestan, the Kandhar region and extends north to Turkestan (4).

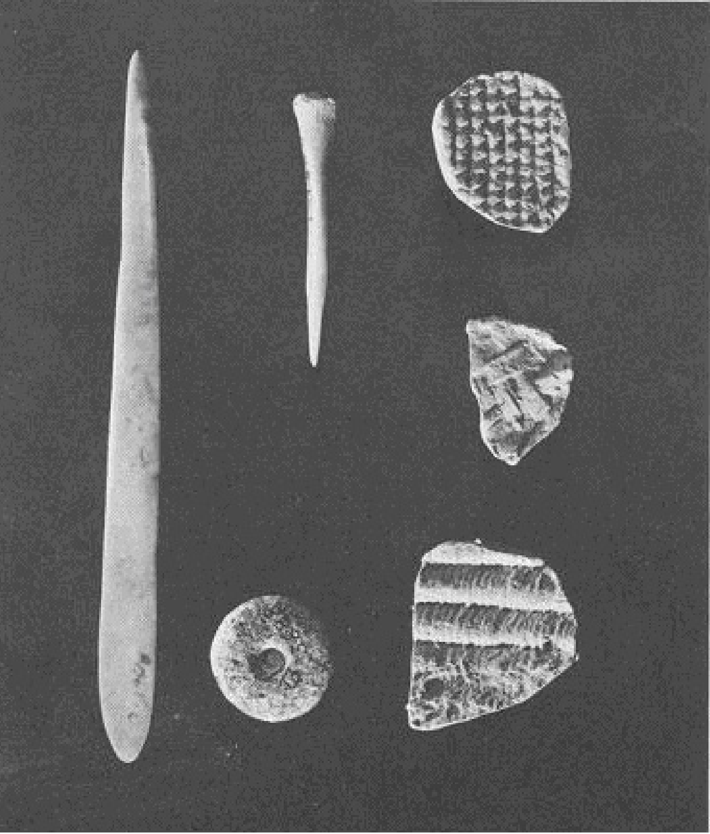
At least twenty sites represent this phase in the Quetta Valley, and they are scattered throughout the valley wherever soil and water resources are combined to produce a good basis for agriculture. This phase, like the Early Harappan phase in general, show the growth of villages to maximum size. At the heart of Quetta city stands the Miri, a landmark in the midst of the plain. Its surface is strewn with the Quetta Ware, suggesting that a good part of the site was occupied during the Damb Sadaat period.

Calibrated chronology of Damb Sadaat II seems to show a broad range with *ca.* 3000 BC as the central point. According to Fairservis, the Indus Civilization *could* be contemporary with the upper levels of Damb Sadaat II or at least the upper levels



The Bull Pot in Quetta Ware from Damb Sadaat II

tively primitive culof Damb Sadaat III. He provides the evidence in the tivators in the form



Indications of weaving from the site of Damb Sadaat II, Quetta

(after Lee Boltin)

form of fragments of thumb-nail incised pottery, per[of] artesian springs. forated pottery, pipal leaf decoration on grey sherdChpater 6), but by this time they are

very
This valley is also
common. They consist of marks on the
the center of a
exterior or base parts of vessel either by
meansnaturalof an corridor instrument
linking southern
simply by the use of the finger nails. Some
Afghanistan to the
of the signs are quite complex and are
Indus Valley viasimilar to
the Bolan and
Harappan civilization script. These potters'
marks areKhojak passes.not
Historically these
factors have made
but as far afield as the site of Periano
it a regional hub of
Ghundai near Fprt Sandeman and, of
settlement, trade
and travel. In the
IV at Mundigak, though it appears they are
Early Indus period
most common in the Quetta area. Taking a
and bird figurines. He also notes that settlements in the Quetta valley seem to be very extensive in the or
DS II-DS III times: 'sites occur almost everywhere in
engraving

the valley where fertile soil and water exist today, indicating that climatic conditions and ecology of the certain signs found in the modern Quetta valley are comparable to those of prehistoric tims' (4).

only
within
Sites essentially of the Quetta valley time
repeated

successive levels within the sites excavated range and type are found with frequency as far south as Kalat. The Sohrab area of the Kalat Plateau has been the main focus of archaeological at

A bull painted Quetta Ware from Damb Saadat II

course, are known for all phases of Period tention. It lies south-southwest of Kalat, a principal point on the communication lines between north and south Baluchistan. On the basis of her work at

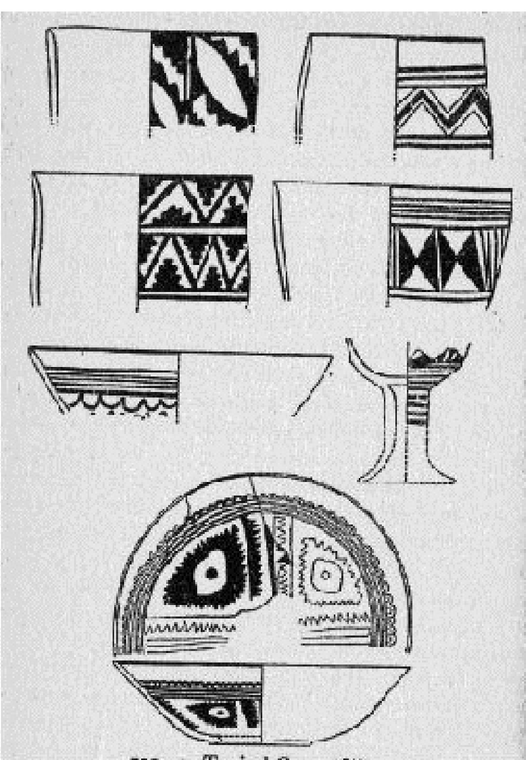
a distinctive set of two sites, Anjira and Siah Damb, Beatrice de Cardi archaeological assemblages developed in Quetta

Pishin and the valleys to the immediate south and north beyond into Afghanistan at the famous site of Mundigak, even reaching Shahr-e-Sokhta in Sies tan. Because of a strong cultural affinity between the Quetta Valley, the Kandhar region and Shar-e Sokhta, this region has sometimes been treated as one cultural unit and identified as Helmand Cultural Phase.

The distribution of Damb Sadaat sites is in teresting. There is a cluster of them in Quetta-Pishin valley and more settlements down the Bolan Pass to Kachi. They are found in the valleys to the east, such as Zhob and Loralai regions. Some sites have also been discovered in Kalat plateau, one such place being Isplenji. A few sites, representing a cul ture similar to the Damb Sadaat phase are in the Registan Desert, the pottery of which is sometimes built up a composite sequence of occupation for the area that shows later levels of its culture related to Quetta Valley, generally DS II and DS III.

In the districts of Loralai and Zhob, to the east of the Quetta valley, the story, insofar as archaeological evidence is concerned, is essentially the same as in Quetta (5). In the Fort Sandeman area, near the junction of the Zhob River with the Gomal, two sites of prehistoric time are well known: Periano Ghundai and Mughal Ghundai. Fairservis excavated these sites and uncovered two late phases that relate to the Dam Sadaat III phase (5). He names them Zhob Cult phase and the Incinerary Pot phase. The latter is characterized by the burial of individuals in vessels after disarticulation and some cremation. These burials were in the floors of houses. The Zhob cult phase, the earlier, is characterized by the presence of the same goggle-eyed,

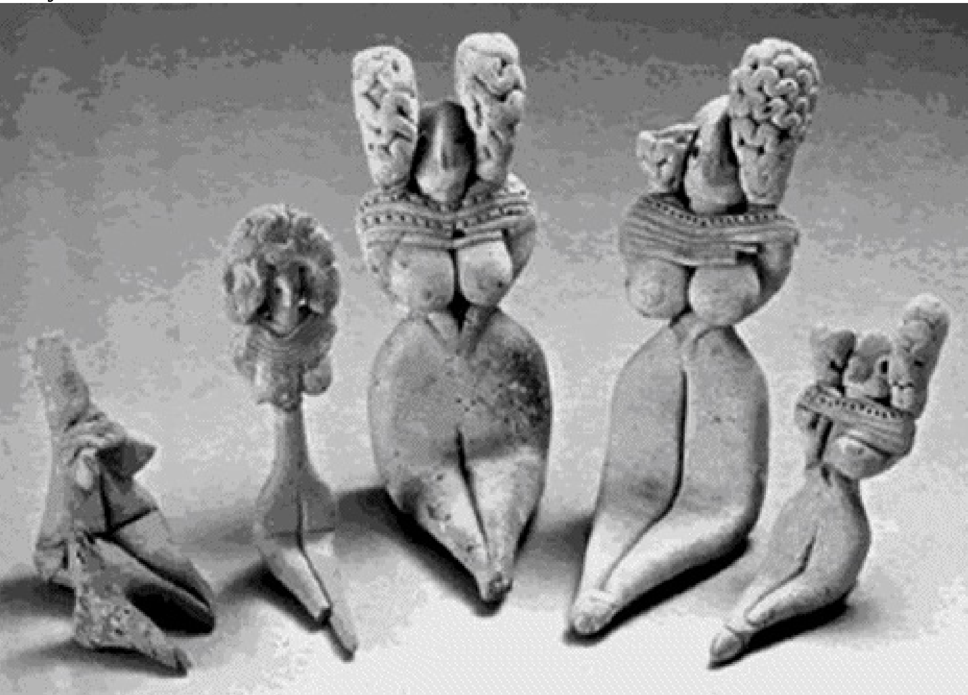
a rapid



Typical Quetta Ware
(*after Piggott*)

upon Early Indus—II!

Early Indus—II!

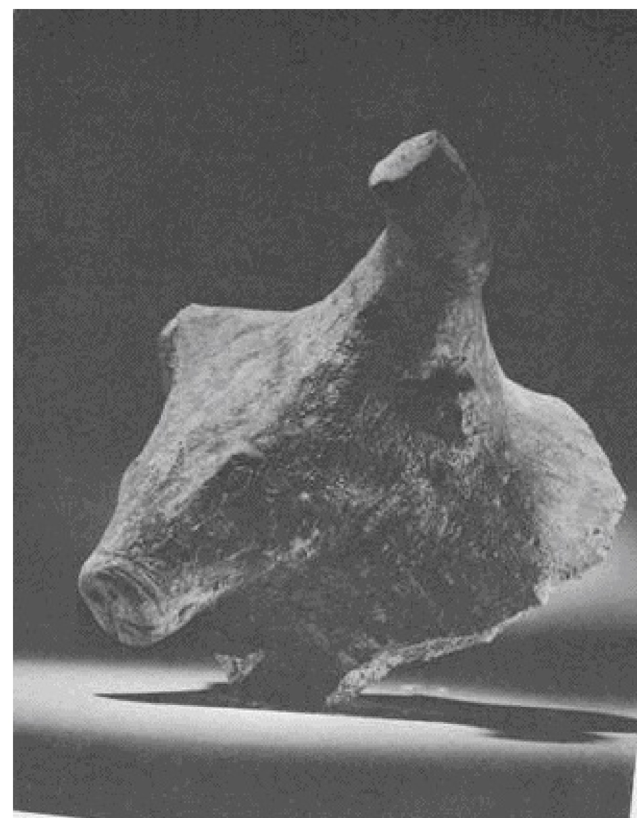


Zhob Valley “goddesses” from the Damb Saadat Phase

them Zhob Cult phase and the Incinerary Pot phase. The latter is characterized by the burial of individuals in vessels after disarticulation and some cremation. These burials were in the floors of houses. The Zhob cult phase, the earlier, is characterized by the presence of the same goggle-eyed,

hooded female figurines known in Damb

Sadaat III and Mundigak IV. Leaf-shaped



Bull head found at Periano Ghundai, near Fort Sandeman, Zohob District (*after Fairservis*)

the Harappan civilization. Between and amid are fore
construction. Houses have a stone foundathe pottery types which were first identified by
made by using fired brick. Associated with this building was the familiar Zhob
stone arrow points and one of bronze and tion,but mud bricks were also used, the roof was
more magnificient bull figurines of terracotta Stein at the site of Kulli, thelargest in Kolwa. The covered with mud-smeared reed. The
pottery from mother godesses as well as compartmented seals, clay bangles, and a potsherd of

public earlier phases of the Niai Buthi I are related to the the earlier occupation is very similar to that from Harappan type. This association suggests that the same situation existed here as

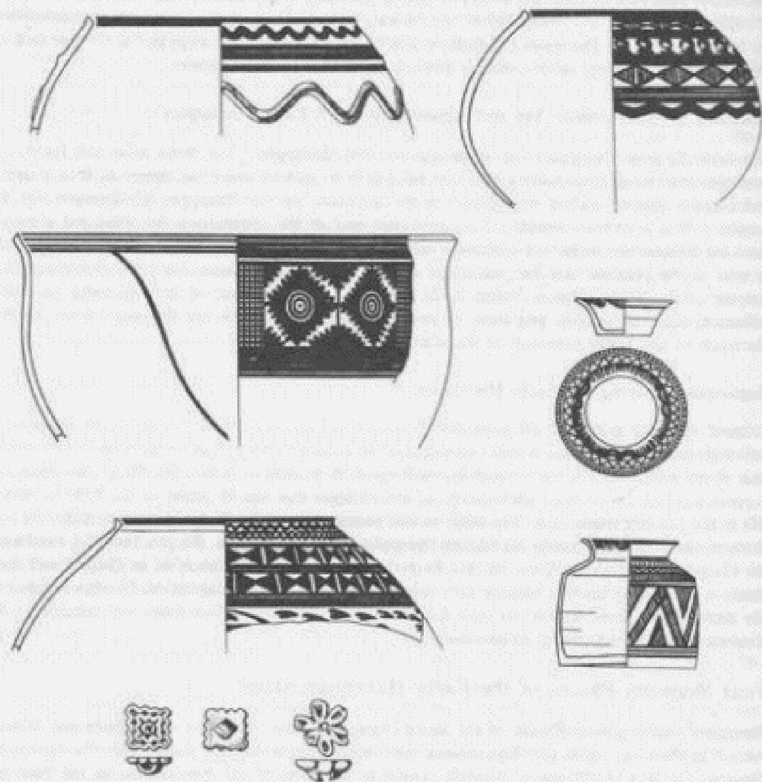
ceramic corpus familiar in the last phases of Early)

Harappan occupation of such sites in the Indus Typical Quetta Ware the Harappan. (*after Piggott*)

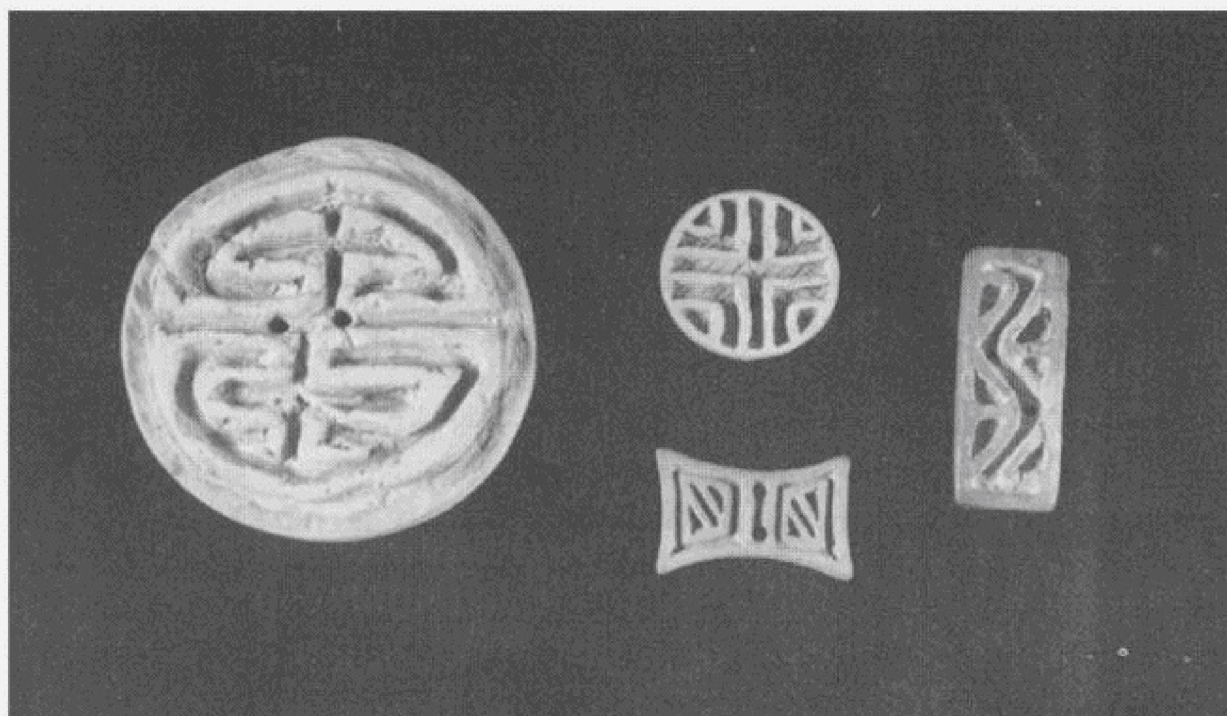
which suggests the Harappan influence. At the earlier levels of Balakot I.

at Periano Ghundai — the contemporaneity of the Harappan type or a prelude to
Typical Quetta Ware from the Quetta Valley (
same Mughal Ghundai, essentially the
An AMS date run on charcoal suggests a
picture emerges, including the presence of
dating into the very early third millennium BC. the Zhob mother godesses and bull figurines

buildings are manifest. It is in these later stages that we are confronted with new elements in the culture unfamiliar in Iran. Among these are the fauna and flora depicted, the peculiar and characteristic figurines, the potters' marks, and certainly the buildings with drains. The Kalat Plateau: South of the



Artifacts from the Dasht assemblage
(*after Besenval)*



Geometric button seals from Mehrgarh V
(after Kenoyer)

Quetta Valley proper, the prehistoric farmers settled on the shores of the ponds which are created by internal drainage.

Painted pottery of Dasht tradition from Registan Desert,

That the sites such as Gwandin and Isplenji were successful is

After
In the
The narrow Baghnao Valley Page 260tion, dates to the later Kulli period. Very small
of the Thal River is the parts of the site were re-used during the latelittle site of Sur Jungle. Islamic or British period. A very large platform
Of the three occupation house site of the Historic Period was built over levels, the last equates scattered houses and possibly fields north of
the main settlement.
to a late phase of the
occupation
We now know of a number of Amri-Nal, at Damb more generally Early Harappan sites, on theSadaat, Not only are coast of the Arabian Sea and its arms in Gujratthe ceramic analogues (India). Balakot is on Somiani Bay and two

precise but in addition little known sites to the west of Karachi, Orthere are familiarangi and Pir Mungo, seems to have Amri-Nal objects such as model assemblages. Both of these sites have now

become a part of the urban sprawl of Karachi.
houses and the Zhob Of the two periods of Balakot, the upper onemother godess to belongs to the Indus civilization whereas theconf

irm th i slower one or Period I constitutes a mixed cul

correlation.
wherein
Nal
The

elements

are
dominant.
An Early Harappan figurine found at Harappa. The excavations
of theWheel made painted pottery, generally related**subject is clothed, which is unusual; she wears a painted**
skirt and carries a bowl. Painted bangles cover her
nearby
site
of Ranato Nal polychrome style, right from the begin**arms, and she is wearing a necklace with pendants**
ning of occupation, has been found. Humped

Ghundai provided **(HARP)**bull figurines, microlithic tools, beads of lapis ample evidence that its lazuli, stone, shell and paste, a limited amountsequence is directlyof copper and miscellaneous terracotta, shell parallel to that of Sur and boneobjects complete the other cultural Jungle.details. Cattle, sheep, goat, buffalo, pig, hare

and deer of several varieties have been identi2700/2600ofamid the ruins of what once had been asite was abandoned.
midst
thethe
uppermost, badly preserved occupa

ValArtifacts:proven by the representation atGenerally, compartmented stamps seals, animal figurines, chippedfied but not much use was made of the availableley as Ghazi Shah and Amri, and in Baluchistan in

and ground stone objects, clay sling balls, copper, and of course, the pottery have110marine sources of food. The grain included six
the upper layers of the mound of Sohr Damb and row barley, vetch, legume and *ber*. The calibratedtheir analogues in the Kandhar site, as they do at Rana Ghundai, Sur Jungal, and p r odate-bracket is between the late fifth millennium Dabar Kot in Loralai, and at Periano Ghundai near Fort Sandeman in the Zhob
Page 256Nal. It is the later levels of Kulli affinity that
duce unfamiliar elements. The upper phase of
district to the east.Niai Buthi has been dat ed by radiocarbon in the and early third millennium BC.
Nal Pottery: The shape of Nal pottery

hooded female figurines known in Damb Sadaat III and Mundigak IV. Leaf-shaped stone arrow points and one of bronze and more magnificient bull figurines of terracotta are also characteristics of this period. A fine black-on-red pottery also occurs, some of which suggests the Harappan influence. At Mughal Ghundai, essentially the emerges, including the presence mother goddesses’ and bull figurines amid the ruins of what once had been a structure made of boulders.

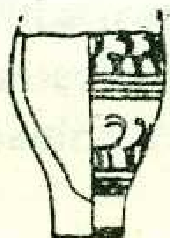
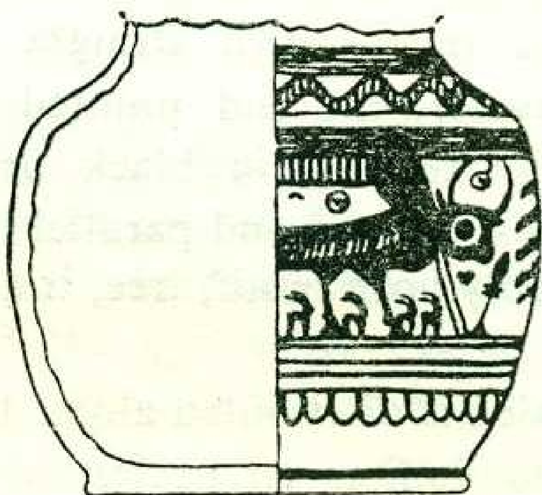
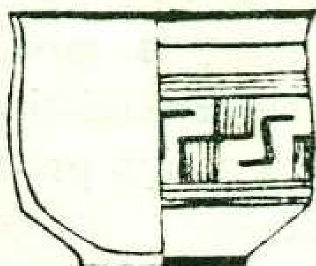
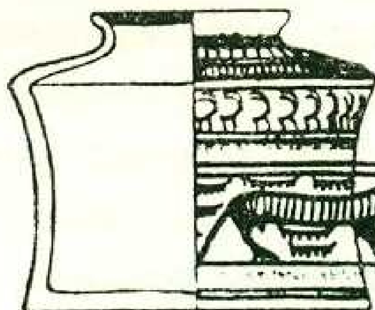
To the south of the Zhob valley is the district of Loralai, in the basin of Anambar River. Here are three well-known sites: Rana Ghundai, Sur Jungal, and Dabar Kot, but there are numerous others. Dabar Kot is certainly the largest site of its kind in Baluchistan. Aurel Stein made a test excavation which revealed the presence of a mud-brick building equipped with drains, which were partially made

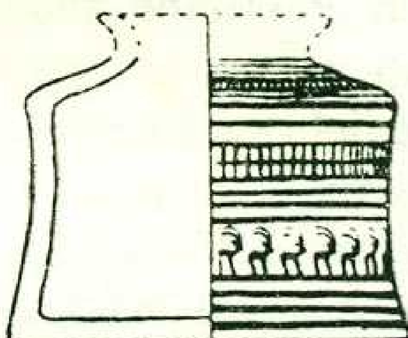
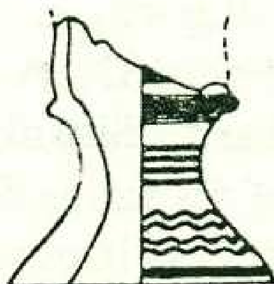
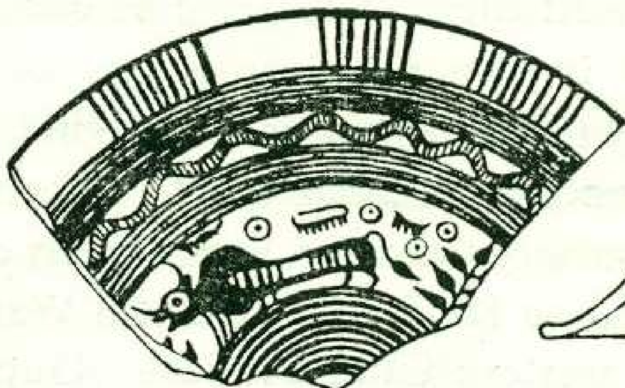
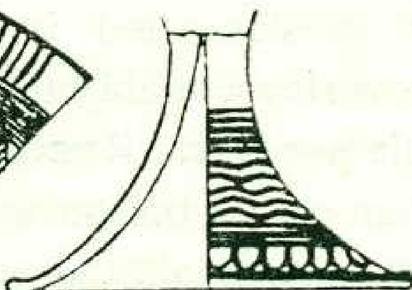
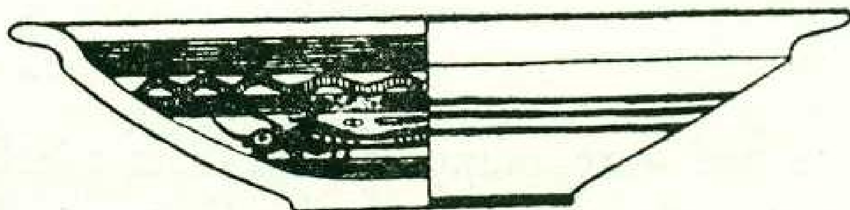
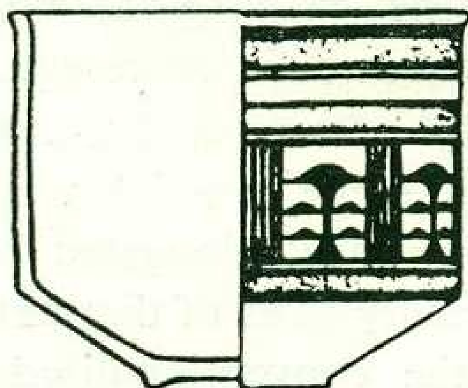
by using fired brick. Associated with this building was the familiar ‘Zhob mother goddesses’ as well as compartmented seals, clay bangles, and a potsherd of Harappan type. This association suggests that the same situation existed here as at Periano Ghundai - the contemporaneity of the Harappan type or a prelude to the Harappan Civilization.

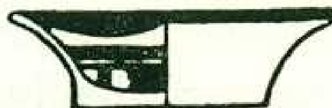
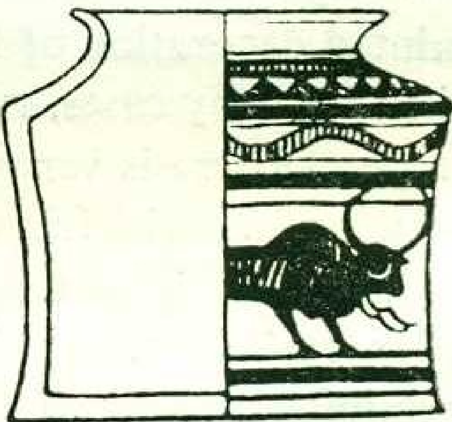
The pottery decoration of Mehrgarh Period V shows the influence of the Quetta Ware, mixed with Nal polychrome elements. The Period VI represents a mixture of late Quetta Ware and Kot Diji Ware. Male and female figurines are abundant. Well-fired grey ware makes its appearance, and there is evidence of inter-regional pottery styles. A large kiln provides evidence of ceramic production for market, which can be taken as a hallmark of incipient urbanization. Terracotta figurines with ornate hair styles, round and heavy breasts, and joint legs form a very distinct component of this time (1).

Much of the Damb Sadaat pottery is a buff ware, occasionally slightly pink. It was often slipped to create a uniform surface, even if it was not painted. Painted pottery is the most characteristic of this phase and is commonly known as Quetta Ware. Pottery from Damb Sadaat sites, such as Mundigak, Damb Sadaat, and Faiz Mohammad, had a number of similarities with Kot Diji pottery, including the presence of Wet wares, but it also included very different features, such as its distinctive repertoire of geometric, animal, and plant motifs.

A ceramic known as Faiz Muhammad Grey Ware was also manufactured. It is a fine ware ceramic, generally rendered as deep, open bowls and shallow plates painted on their interior with a series of concentric lines capped at the rim by a single line of loops. The lines surmount the lower portion of the bowl and plate, which is painted with a variety of geometric or naturalistic motifs. Among the latter are fish, birds, snakes, and papal leaves - none of which are depicted in comparable painted pottery in the Iranian area to the west. Faiz Mohammad Grey same picture of the ‘Zhob ware was manufactured in two stages, being fired first in oxidizing conditions and then refired in reducing conditions in high-temperature kilns to produce its gray color. Technologically it resembles Emir Grey ware, a type of pottery that was found in east Iranian sites, though the two wares were differently decorated. Faiz Mohammad Grey ware shares motifs with local Quetta ware, which was decorated with plants and animals and geometric motifs such as zigzags and stepped-square patterns. The latter are paralleled in regions to the northwest, including Bactria and Turkmenia, where compartmented seals and figurines similar to those of Damb Sadaat are also known.

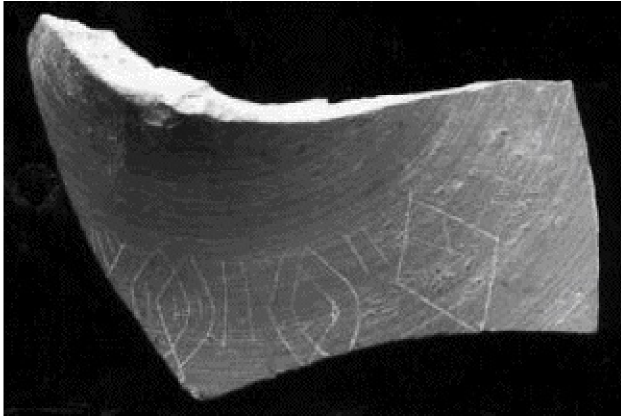





Kulli painted pottery

There is some architecture in Damb Sadaat II. This architecture is much more pronounced in Damb Sadaat III. The houses of the period were well- made mud-brick structures consisting of several small rooms. Slabs of limestone were used in wall foundations frequently. In some of these houses both fire pits and ovens were located, the former construction appears to be like a *Tandoor* currently used throughout Pakistan and the latter seems to be a precursor of a *Dash* which is currently common in Quetta and Kandhar area. The final period of Damb Sadaat phase in Quetta valley



Red slipped pedestal with
potter's marks
Bakar Buthi (Kulli culture)

be separated straitigraphically. Majumdar

saw the danger of considering the material

is best represented by the construction of monumain site of Kolwa is Kulli which has given its name

mental buildings located on the highest part of a from Mehi as necessarily of one period,

site. The one structure which is particularly known with it. A second major site of this culture is Mehi

was discovered in the uppermost levels of the siteand stylistic considerations suggest that

of Damb Sadaat. The houses of mud brick, the Kolwa. As the third important site,Edith Shahr Com

string- marked vessels, and lunate- incised bowls,there are at least two ceramic strains,typical of the Harappan civilization, in Zhob Loralai and exposed both at Kulli and Mehi. The same is true valleys suggests the Zhob cult's contempo representing an earlier painted ware local raneity with at least one phase of that urban culture. cently been excavated.

One of the distinguishing accomplishments ofto the region on which impinged a plain

the Damb Sadaat Phase was the growth in connecsurveys, has done a lot of work on the Kulli culture tions between Baluchistan and Central Asia. The and most of our understanding comes from him (6). Baluchistan-Central Asia interaction sphere

ware, as indicated above. We shall return

In keeping with the early archaeologists and prehis

emerges in the archaeological record as one based on durable goods, mostly stone and metal. With the exception of turquoise there are few durable goods torians of Europe, Piggott is also in perpetual

search for the connections of Baluchistanto the Harappan cultural elements in South with

Mesopotamia or at least with Iran. He does find

from Central Asia that might have been desired by Baluchistan when dealing with this culture

the inhabitants of Central Baluchistan. For its part,

and its far-flung settlements in a separate volume, Baluchistan might have supplied copper and Afghan

tin. Apart from the archaeological record of durable

For the present we may notice that distinctive Harappan pottery of the trade and exchange must be happening in Lake. It is now widely agreed that the Kulli culture appears at several locations in addition to an array of pots which represents a did cross the mountain barrier eastwards into the felts, leather and pelts. Indus plain, and that its connection with Iran is mar mix of the Kulli and the Harappan. The earlier pottery shows visible influence of ginal at best.

national scholars and archaeologists that Quetta

Ware had its origin in Central Asia and it is a rare treat to differ with the impeccable authority represented by these established scholars concerning

A most interesting and attractive feature of the

this point. This opinion is, however, based largely on the presumption of west-to-east and north-to

Kulli phase, and one which marks it off from

south diffusion theory that has been so popular among prehistorian of 19th century Europe. It was

the other regional groups we have studied in

almost given that civilization must have moved in those directions. One cannot expect otherwise from

the preceding pages, is the frequent presence of

the scholars of the colonial age. As the theory of Mesopotamia-to-Indus has been revised in recent years, so is the theory of the origins of the Quetta

baked clay figurines of women or of cattle. It Ware. While the transmission of motifs from Central

Asia to Kandhar to Quetta is valid, the reverse could

must be confessed at the outset that we have nobe as much true. No archaeological evidence is

available to prove either point. Possehl (1) has at

certain knowledge of the use or purpose of tempted to rationalize the issue by considering the

whole region as one artistic sphere in which Central

these little figurines. They can be regarded Asia provided the motifs and Quettta provided the

form.

only as toys, or they can be assigned a role of

Kulli Culture: The distribution of the Kulli sites makes it the largest cultural horizon in the moun

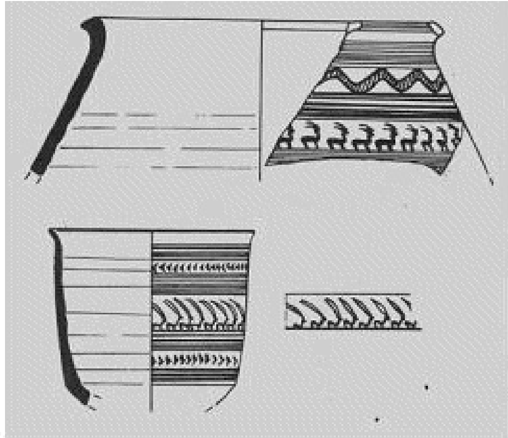
offerings.tains, but very little is known about the nature andEuropean chistan, Kulli ware is largely coincident with theSomedevelopment of this westerly neighbor of the Indus Nundara and Nal wares of the Amri-Nal culture butarchaeologists have described them as regionalCivilization. Hab and Saruna valleys have recently it does not feel at home in the hills of Baluchistan.been surveyed and quite a few Kulli sites have been Kulli culture is primarily defined by the form of its deities on the pattern of later days Hinduism.found, many of them belonging to the Early Harappottery and ornaments. It is, however, given further pan timeframe. definition and its independently status vis-à-vis the

The Kulli figurines are of clay, and the animals Kulliculture isnormallyassociatedwith Amri-Nal culture by a difference of burial rite andKolwa and the area around Las Bela. Bela lies in the abundance of clay figurines of women and anithe Welpat tract, which is watered by the Porali are painted, though not the women. The cattle figurines outnumber the women

mals on almost every site of the culture identified (7).
eastern Persia but the evidence is very marginal.

Similarly, like many of the early to minimize the in *The Rise and Fall of Indus*

fluence of the Kulli culture in the western Sind which



Pottery with animal figures from Kulli and Mehi (*after Stein*)

Kulli pottery with animals figures (after Stein**)**

Over most of the area of settlement in Balu

ture and its position on the route from the coast to Kalat. The Kolwa tract lies to the north-west of Bela and was known for its large quantities of grain, which were exported to its neighboring areas. The

Page 312

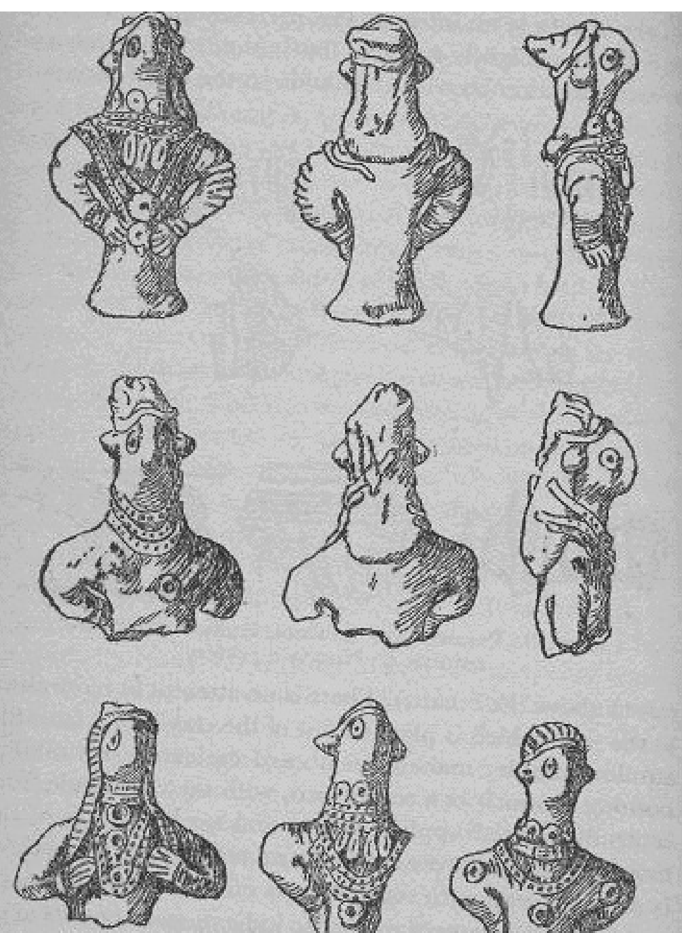
The lay-out of some sites resemble the plan of Harappan sites: Rows of houses are built along lanes and streets, which are sometimes paved. Sometimes, stairs provide access to upper terraces

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. Building materials were large ashlars or boulders, and the houses are often preserved to a considerable height.

Many of these sites are located in strategic Early Indus—III!positions, on top of mountains or terrace hills, overlooking the valleys and controlling the plains and passes. Other sites are small hamlets built in the open plain. Although they have no defenses, they are of a very compact appearance. Most sites are associated with dams

miscellaneous culture to be
Shahi-tump are
to be archaistic lapis-lazuli



Clay figurines from Kulli culture

Clay figurines from Kulli culture

A point of intense discussion among various archaeologists has been the extent of interaction between the Kulli phase and the Mature Harappan Civilization and their relative chronology. Harappan influence has been obvious during the Mature Harappan Civilization. What is not settled is whether

Kulli (12 ha), the largest mound in Kolwa, very probably represents the

the Kulli phase did contribute anything to the Harappan Civilization before it itself submerged into it. Most of the archaeologists tend to subscribe to the opinion of Piggott that the Kulli culture did not have much to do in the development of the Harap

figurines and painted terracotta

pan Civilization and that the diffusion of culture and technology during the Harappan Civilization was only from the East to the West. Although no specific evidence can be offered to counter this general belief, it is hard to imagine that the Kulli culture did not contribute anything to the Harappan Civilization when every other Early Harappan culture in one form or the other did. For example, at the site of Mehi in the Mashkai, two strains can be observed in the pottery-making tradition, one representing by

Page 313 the normal painted wares of the Kulli phase and the other by plain wares and associated artifacts of types to be later fabricated at Mohenjo-daro and Harappa.

The discussion of the pottery from the Kulli settlements is complicated by the presence of varied

traditions which cannot be separated straitigraphically. Majumdar saw the danger of considering the material from Mehi as necessarily of one period, and stylistic considerations suggest that there are at least two ceramic strains, representing an earlier painted ware local to the region on which impinged a plain ware, as indicated above. Distinctive Harappan pottery appears at several locations in addition to an array of pots which represents a mix of the Kulli and the Harappan. The earlier pottery shows visible influence of Amri, Nal, and Quetta Valley.

A most interesting and attractive feature of the Kulli phase, and one which marks it off from the other regional groups we have studied in the preceding pages, is the frequent presence of baked clay figurines of women or of cattle. It must be confessed at the outset that we have no certain knowledge of the use or purpose of these little figurines. They can be regarded only as toys, or they can be assigned a role of votive offerings. Some European archaeologists have described them as regional deities on the pattern of later days Hinduism. The Kulli figurines are of clay, and the animals are painted, though not the women. The cattle figurines outnumber the womenfigurines. The female figurines, although less abundant than those of cattle, are widespread among the Kulli sites and are of great interest. They all terminate at the waist in a slightly splayed, flat-bottomed pedestal, and the arms are resting on the hips. Face is made carelessly by simply pinching the clay, transforming the figurine to an absurd caricature of a woman. All of the women's' figurine wear heavy ornaments, around the neck as well as in the ears. Bangles are also shown around the wrist. It would be interesting to compare these figurines with those of Harappa and wonder if a Kulli village girl has not wandered into a metropolis of the land!

Finally, there are few miscellaneous objects in the Kulli culture to be mentioned before discussing the individual sites. Stone saddle-querns and riders fro Kulli attest grain-growing, chert blades from Shahi-tump are comparable to those in the Amri-Nal culture and seem to be archaistic survivals. Beads including lapis-lazuli and agate were found at Kulli, and from this site also came an odd small pillar of polished purple-red and white variegated stone, 8 inch high and 4 inch in diameter at the base. From Mehi comes a cubical gray chert weight, of exactly the Harappa type. Clay bangles occurred at Mehi and Siah Damb.

The significance of the Kulli culture lies in bridging the gap between the upland Baluch cultures and the plains' evolving traditions. It provided this connecting bridge in two ways. First, it brought the results of the past cultural developments of Baluchistan to bear upon the revirine culture that was evolving in the plains of Sind and Punjab in the shape of predominantly Kot Diji traditions and which eventually led to the blooming of the Indus Civilization. Second, the Kulli culture connected the two regions on chronological basis because of its existence not only in the Early Indus times but also in the Mature Harappan Civilization. This connection in time and space probably gave a still yet undetermined impetus to the synthesis of a common culture throughout Pakistan.

Kulli (12 ha), the largest mound in Kolwa, very probably represents the principal prehistoric settlement there. The surface collection illustrated by Stein is dominated by the exuberant black-onred slip decorated pottery familiar in the cremation phase at Mehi. Included are female figurines and painted terracotta bulls, exactly as recovered at Mehi and Niai Buthi II levels. Surface clearance showed multi-room stone structures, the blocks of their shale being brought from about 3 km away. Some of these structures were probably used as storage rooms for grain. Within these structures or in the vicinity, Stein found fragments of copper, lapis lazuli beads, bone bangles, a grater, and grindng implements. The pottery included storage vessels decorated with raised wavy bands and black-on-red

slip, and canister jars decorated with bug like animals identical to those of the latest phase at Mehi. There were two massive stone querns and their rubbing stones. Pottery is elaborately decorated and diverse in shape and color, but a characteristic feature is the presence of elongated animal forms with large and round eyes, shown in framed la ndscapes. Similar decorative motifs were found at Nindowari as well.

The site of Mehi (10 ha), located in Mushki Valley to the north-west of Kolwa and some forty miles to the light on the nature of the Kulli culture. On the surface, Stein found numerous fragments of both bull and human female clay figurines. The area explored by Stein turned out to be a cemetery in which cremated remains were sometimes buried in vessels or sometimes in the ground. Intimately associated with these burials were copper tools, beads, and terracotta figurines representing women, bulls, and birds.

It is of comparative interest that the incinerary urns illustrated by Stein are of the plainer variety. Some were directly comparable in form and decoration to thosefound at Periano Ghundai. The female figurines of Mehi are clearly analogous to those of the Zhob cult. The goggled eyes, necklaces, shoulder form, pedestal bases, hanging hair, and hoods obviously represent the same basic composition. The bull figurines are generally somewhat cruder than those of the Zhob cult, but have parallel in Damb Sadaat III in the Quetta Ware. Parallels to the bird figurines are also found in the Quetta Valley.

A very important group of vessels carved out of soft stone comes from Mehi, and, as we have mentioned above, has been offered an evidence of an intimate connection between South Baluchistan and Mesopotamia of the time. There are several types of vessel represented. The more elaborate pots are decorated with fine engraved patterns of chevrons and triangles. Pots similar these from Mehi appear in the sites near Bampur and in Siestan. A fragment of such a stone vessel has also been found at the lower level of Mohenjodaro. The connection of eastern Iran with southern Baluchistan has been demonstrated in the earlier times as well. This Kulli connection is apparently a strong link of this chain of continuous, but sometimes sporadic,relationship with the west.

Information about burial rites in the Kulli culture is rather scanty. A flexed inhumation burial was found at Kulli, there were no grave-goods and consequently its association with the culture is unproven. At Mehi, however, Stein cut a trench through a cremation cemetery. Here minor variations of the cremation rite were observed: in some burials the cremated bones were in pots; in others deposited directly in the soil; while in one, six children’s skulls had been placed over a single cremated adult. Pottery, clay figurines and copper objects comprised the grave-goods, the latter being particularly rich in copper and bronze objects. The most outstanding find is the copper mirror, 5 inches in diameter, with the handle representing a stylized female figure in the manner of the clay figurines, with breasts and conventionsalized arms on the hips, with the face provided by the reflection of the user of the mirror (see attached figure). This amusing trick and the sophistication of the metal-working technology make the Kulli culture stand out among the regional cultures of the time. In the Mehi cemetery were also found two copper pins, one with a flat, disc- shaped head and the other a head made of a small lapis-lazuli bead. Frangments of simple copper bracelets and of a small bowl were also found at Mehi.

The most important site discovered by Stein is Niai Buthi about three miles to the northeast of Bela. It is set in the midst of the cultivation, and, in fact, both its eastern and its western slopes have been cut

away by cultivators. The faces along these sides exhibit sections that in some cases run up to 20 feet in height. Stone and brick walls are exposed throughout these faces. Two main periods of habitation have been identified. The pottery in both periods is wheel- made and tends toward thickness in construction. The painted wares are generally of the Kulli type and can be divided into three main groups: (1) black- on-buff; (2) polychrome painted vessels in which red bands and black designs divided by simple lines alternate; (3) black-on-red slip design that include pipal leaf motifs in the Harappan style, as well as animal and geometric elements

At Nindowari (4.5 ha), there is a central, stepped structuralcomplex, its stone-blocks weighing up to one ton. Associated with this is an assemblage of typical Kulli pottery, terracotta, mothergoddess figurines with appliqué decorations, painted bull figurines and two Indus seals. The calibrated date is mid-third

Fairservisexcavatedseveralsitesinthe northern extremity of Welpat. The discoveries there throw considerable light on the earlier Early Harappan period associated with Kulli as well as Nal cultures. The archaeological resources of this eight-mile stretch of valley are such as to make it one of the most important areas of Indo-Iranian cultural borderland in ancient Pakistan. Within the area there are at least five structures of one kind or another, clustered into groups and strung out along the valley. Almost all of these structures are of stone construction and are therefore remarkably preserved. Many have walls standing above four feet, and the ground plan for a great number of buildings is readily traced. In most cases it seems apparent that the stone construction was to support walls of brick or wood that have long since disappeared. Fairservis divided these groups of settlements into two: Complex A of Kulli culture affinity, generally contemporaneous with Nia Buthi II, and Complex B which is of later times, of Mature Harappan period.

Edith Shahr shows a matrix of large river boulders set in mud and smaller stones. There is a series of stepped platforms and typical Kulli pottery and mother- goddess figurines. Edith Shahr has been associated with the upper phase of Niai Buthi. It may be noted that Las Bela has a known source of copper and it will not be surprising if the sites mentioned here are reflective of the wealth by mining and metallurgy in the Indus civilization period.

The Edith Shahr situation is strikingly illustrative of nucleated villages andindeed town life. The bulk of the nucleated village sites, with their significant monumental and formal structures, are located in the most unproductive part of the Welpat area. The ordinary village sites, on the other hand, are located in the midst of the rich cultivated plain to the south, The Edith Shahr sites are large and are evidence for sizable populations clustered around monumental buildings whose function was most probably ceremonial. Obviously, the presence of these “township” sites close to but not within the most productive part of Las Bela speaks for a symbiotic relationship with the villages. In its simplest sense this might mean food for ceremony or shamanic magic. How much control was held by the inhabitants of the formal sites over the villages of the cultivated plain is, of course, uncertain, but the fact that both seemed to flourish is indicative of a continually successful relationship, whatever it was. Kulli-type settlements are also found outside Las Bela in Wadh, Ornach, and Drakalo, to the north, and in Kolwa, to the west. The use of stone for monumental structures mains. Typically there around it traces of a massive enclosure wall. A tendency to centralized settlement and a diminution in number of villages in a limited area such as the Ormach is evidenced by sites throughout the region. characterizes these reis a central mound and

Balakot (2.8 ha) is the primary site so far excavated. It lies in the Khurkera alluvium plain at the mouth of the Winder River falling into the Somiani Bay. Of the two periods of the site, the upper (Period II) belongs to Indus Civilization whereas the lower one or Period I constitutes a separate culture, named Balakotian. It is closely related to the Kulli with some elements of the Nal. We find mud-brick houses whose orientation is different from that of the Period II houses. Wheel-made painted pottery, some related to Nal polychrome style, right from the beginning of occupation, has been found. Humped bull figurines, like those of the Kulli, microlithic tools, beads of lapis lazuli, and some copper complete the other cultural details. Cattle, sheep, goat, buffalo, pig, hare and deer of several varieties have been identified but not much use was made of the available marine sources of food. The grains include sixrow barley, vetch, legume and *ber.* The calibrated date-bracket is between the late fifth millennium and early third millennium BC.

The Peripheries and the Neighborhood: The Early Harappan period saw the spread of occupation over the eastern portion of the GhaggarHakra river braids, extending into the Indian states of Haryana, Punjab, and Rajasthan on one hand and into Kutch and Saurashtra on the other hand. The contemporary Early Indus type settlements in southeastern Afghanistan (the Helmand region) have already been mentioned in the above. Besides these food producing cultures or the offshoots of some Early Harappan cultures, we encounter hunter-gatherers societies in the north (the socalled Northern Neolithic Culture), the Mesolithic groups in Rajasthan (e.g. Bagor) and and pastoral peoples in the neighboring Gujarat.

Sothi-Siswal Culture: The pre-urban culture across the Indo-Pakistan borders in the valley of Chautung has been named Sothi-Sisal, after the type sites. Besides Sothi and Sisal, the sites of this culture include Rakhigarhi, Kalibangan, and Bananwali. Kalibangan and Banawali are the best documented sites during the Pre-urban period of settlement in the Ghaggar region. The materials at Banawali and Kalibangan are "identical in respect of ceramics, architecture, and antiquities" (9). Most of these settlements are clustered in and around the ancient riverbeds. A few of them are rather large. Rakhigarhi, for example, has been reported to be 100 hectares in size, though no definitive publication is available at present.

The settlement of Kalibangan was situated in the triangle of land at the confluence of the Chautung and the Ghaggar. It was about 4.5 hectares in extent. A substantial mud brick was several meters wide, with a gate in the north side, enclosed a roughly rectangular mound, of which a small part has been excavated, revealing mud brick houses apparently built along streets oriented in the cardinal directions. Courtyards formed the center of houses, which were furnished with ovens. A wall also surrounded Bananwali, situated on one branch of the Ghaggar River system. This was probably designed for flood defense because there is evidence that it eventually collapsed due to water damage, after an attempt to reinforce it with a subsidiary wall alongside.

Sothi-Sisal pottery included a fine red ware and some coarser waters, often similar to those from Kot Diji Choliostan: some Kot Diji wares were also present. Flora and fauna motifs were common. Sothi-Sisal pottery is found in the pre-Urban sites in this region, but it also continued in use alongside the Indus pottery in the mature Harappan period and is found in sites of the post-urban period. The chronology of the Sothi-Sisal tradition is not well established: only Kalibangan has been dated by radiocarbon, but its dates are not internally consistent.

There is currently no clear synthesis concerning the relationship of patterns identified on the

Ghaggar (in India) and its extension in Pakistan (the Hakra).The ceramics in northwest India in this Preurban period bear strong similarities to the Kot Diji types in Cholistan. Still, there is sufficient variation in forms and surface features that archaeologists have established a separate category. Resemblances between the Kot Diji ceramics in Cholistan and the Sothi-Siswal materials in the Divide are not surprising given the contiguous nature of the two regions. Interestingly, there are occasional pottery links to northern Baluchistan, as was the case in Cholistan, Harappa, and some of the Beas settlements. These data complement the evidence for technologies (for example, faience) known at other contemporary settlements and non-local raw materials, such as copper, gold, steatite, marine shells, and lapis lazuli that are suggestive of interaction among these and other Pre-urban settlements.

Early Harappan Settlement in Kutch and Gujarat: Until recently it was assumed that the earliest settled agricultural communities in Gujarat were associated with Mature/Urban Harappan phase of the Harappa Civilization (*ca.* 2600–2000 BC). Recent excavations carried out at Loteshwar (15) in north Gujarat, Padri (16) in Saurashtra and Dholavira (17) in Kutch and the reanalysis of archaeological data from previously excavated sites at Prabhas Patan, Lothal and Surkotada have suggested that prior to the incoming of the Harappans, Gujarat was already inhabited by the regional *nonHarappan* communities.

On the other hand, important evidence has been brought forth recently from Nagwada and Santhli regarding the early penetration of Harappans in north Gujarat. The pottery found from the extended inhumation and symbolic pot burials show similarities with the Early Harappan level at Kot Diji, Amri and Balakot. Analogous pottery types have been reported from secondary fractional and pot burials from the cemetery at Surkotada. These too are comparable with Early Harappan burials of Sindh and Baluchistan (18,19). Stratigraphically the burials at Nagwada are found below the Mature/Urban Harappan levels. Impressive evidence of an Early Harappan occupation has also been brought to light from the excavations at Dholavira. The 60–70 cm deposit at the bottom of the total habitation remains of over 12 m at the site belongs to Early Harappan phase beneath typical Mature/Urban Harappan occupation (17).

All in all, the evidence shows (20)) that some areas of Kutch and Saurashtra were colonized or otherwise influenced through some forms of diffusionary processes, by the Indus people quite early on, probably as early as in the fourth millennium BC (1,21,22). Most probably, the area was frequented by the Indus pastoralists who were followed by the farmers (23). Possehl has noted that the area was largely occupied by semi-nomadic, hunter-gatherers groups that predated the Harappan intrusion and that continued to exist alongside the new Harappan settlements wherever they took roots. He hypothesizes that these populations actually may have played a key role in mediating and facilitating Harappan exploitation of local resources, but he does not offer any evidence for such an interaction. In the absence of a clear evidence, the Early Harappan culture in Kutch and Saurashtra should be considered as intrusive. In this context, the preexisting populations in Kutch and Saurashtra had little relevance to the Harappan settlements there, nor was there any deep cultural interaction between this area and Sindh.

Notwithstanding the circumstances under which the Early Harappan established their settlements in Kutch, Saurashtra, and possibly in northern Gujarat, most of these settlements did not grow into Mature Harappan although a few of them almost approached this threshold. Mature Harappan settlements came into being largely afresh, not on the foundation of the earlier settlements. The importance of Kutch and Saurashtra for the Harappans lie in the fact that this area has remained

populated by the Harappans much longer than Sindh and Punjab. This means that the Harappan traditions lingered on for much longer period of time here than anywhere else.

Neighbors to the West: Farming settlements had been established in western Iran and Turkmenia for millennia, and contacts across the region had supplied Mehrgarh and other sites with small quantities of turquoise and lapis lazuli. While much of the Iranian plateau and Turkmenia was mountain or desert, making agriculture possible only in limited areas, the region was rich in timber, metal ores, attractive varieties of stone such as chlorite, and other minerals.

During the fourth millennium, Elam, in southwest Iran, was closely linked to developments in Mesopotamia, sharing the cultural advances that took place there, including the emergence of accounting and writing systems by 2900 BC. The growing demand for Iranian minerals trade, which in turn encouraged the spread of Near Eastern goods and ideas. In the late promoted eastward fourth millennium, Elam shifted its focus of attention eastward, away from Mesopotamia and toward the towns that had developed in key locations on the Iranian plateau, where there was not only land suitable for cultivation but also access to local minerals or an important situation with respect to the trade routes. It seems that Elam at this time no longer merely participated in the trading networks but also established trading outposts in many of the towns to give more direct control over the movement of goods. The presence of Elamites is attested by the discovery of a number of seals and sealings bear- ing Proto-Elamite writing and numbers, concerned with such administrative matters as the supplying of agricultural produce, at settlements such as Tepe Sialk, Tepe Yahya, and Tal-i Malyan (Anshan). The abandonment of writing and the return to the use of the traditional uninscribed stamp seals reflects the withdrawal of the Elamite presence from these towns around 2800 BC.

In subsequent centuries the Iranian towns continued to flourish and grow and to take part in a trading network linking Mesopotamia, Elam, other Zagros cultures, Turkmenia, Baluchistan, and the Indus region. Among the most distinctive manufactured goods in circulation at the time were carved stone vessels in the so-called Intercultural style, which were made at Tepe Yahya and possibly at other sites in the Kerman region, including Jiroft.

One of the few regions favorable to settlement in the eastern part of the Iranian plateau was Seistan, adjacent to Baluchistan. Here the Helmand and Arghandab Rivers flowed into a marshy inland delta debouching into the Hamun-i-Helmand, a vast lake. The Helmand Basin was inhabited by farmers who used irrigation to grow wheat and barley, grapes, melons, and other crops, including flax. They also raised cattle, camels, sheep, and goats; hunted game; and caught fish and waterfowl. Strong similarities in artifacts such as pottery and figures between the Helmand Basin and Chalcolithic sites in southeast Turkmenia may indicate the arrival during the later fourth millennium BC of some settlers from the latter region, where irrigation agriculture was well developed and where in the Hari Rud delta there was substantial depopulation at thistime. By 3200 BC, a small town had developed at Shahr-i Sokhta (period I) on a terrace of the alluvial plain, south of Hamun-i Helmand. This settlement of around 15 hectares had an Elamite presence, indicated by the discovery of a tablet inscribed in the Proto-Elamite script and a number of sealings.

After the Elamite withdrawal around 2800 BC, Shahr-i Sokhta (period II) continued to grow, becoming increasingly important as the center of a thriving agricultural region with many small villages. Its prosperity also depended in part on its role as a break-of-bulk center for lapis lazuli, which was brought here as raw nodules from which Shahr-i Sokhta artisans removed extraneous

material, exporting only pieces of pure lapis. A huge cemetery outside the town contained a considerable variety of burials, including some in brick-built chambers, well furnished with fine jewelry, pottery, stone vessels, and metal- work. Routes linked the region to southern Turkmenia, Baluchistan, and Kerman, respectively to the north, east and southwest of Shahr-i Sokhta.

The Northern Neolithic. In Kashmir, the earliest settlements with evidence of agriculture and animal husbandry appeared around 3000 BC, mainly concentrated on the Pleistocene alluvial terraces *(karewas).* Villages such as Gufkral and Burzahom were made up of partially underground huts: these were pits with plastered walls that were accessed by means of steps or ladders and that probably had conical superstructures supported by central posts. The inhabitants of these villages hunted a range of wild animals but they also kept domestic dogs, sheep, and goats, and cultivated wheat, barley, and various pulses. Although the animals may have been local domesticates, the crops were probably acquired from their southern or western neighbors. These settlements show a shift from a largely hunter-gatherer economy to one dominated by farming by the middle of the Neolithic period.

The people of the Northern Neolithic culture made rather coarse gray pottery with mat impressions on the base and tools of bone and polished stone. These included rings of jadeite and distinc- tive rectangular and half-moon-shaped knives that resemble the harvesting knives used by the Neolithic people of northern China, who also lived in semi-subterranean houses. Burials of dogs at Burzahom were also reminiscent of Chinese and Manchurian practices. Physically, however, the people of Kashmir were related to those of South Asia rather than China or Central Asia, though they may have spoken a Sino-Tibetan language. Similar pit houses were the norm in other northern areas, in settlements such as Kalako-deray and Loebanr in Swat, and Sarai Khola, Leiah, and possibly Uchali in the northern Punjab.

The Swat people used bone tools that are also reminiscent of tools used in northern China. Although each area had somewhat different local traditions, which can be seen in such things as the style of pottery they made, there were also general similarities, suggesting contacts between them. The existence of long-distance contacts is underlined by the discovery of jade beads at Loebanr, since jade came from Central or East Asia. Two Kot Diji pots found at Burzahom, one containing carnelian and agate beads, show that the people of the north were also in contact with Early Indus people, probably when the latter sought raw materials in the mountains.

Commonalities in Early Harappan Cultures: Though the Early Harappan period was not a time of great innovation, there were many developments in the existing technologies, such as a range of fine pottery and figurines that display great liveliness and imagination. These are often more realistic than in earlier periods and cover a wider range of subject matter, and the human figures are shown in a greater variety of postures. For example, one female figurine from Harappa is standing, holding a bowl and wearing a skirt; details of her skirt's weave and her jewelry were painted on. Features were not only modeled or shown in paint but also incised or added by applique. The widest range of figurine types was found at the adjacent sites of Mehrgarh VII and Nausharo I. Many depict women, scantily clad but generally lavishly adorned with jewelry and head ornaments or with a variety of hair styles. Some male figures are also known at Mehrgarh, generally wearing turbans. Humped bulls are still the main animal figurines, but now others are also depicted, including ram figurines at Harappa that had holes for wheels (11).

Wheel-made pottery predominated, although handmade wares were still produced as well. Some

pottery was also formed in molds. Pots were fired in updraft kilns but also in open-air bonfire kilns. Two small kilns for firing figurines and terra-cotta bangles were found in the AB mound at Harappa. Terracotta bangles found here were decorated with pinched, incised, or painted patterns, and their firing conditions were controlled to produce a red (oxidized) or gray (reduced) color. An increasing number of bangles were also made of marine shell. Steatite was used now not only for beads and other ornaments but also for seals.The practice of glazing some steatite objects developed further and gave rise to the production of faience. This is attested to in the later Kot Diji levels at Harappa, where microbeads and a variety of larger beads began to be made from frit (ground-up silica and glazing material made into a paste and formed into beads that were then fired).

Copperartifactswereprobablybecoming more common, since many tools and ornaments have survived. Small objects of gold are found in larger numbers, including pendants, beads, and small gold discs from Harappa that had apparently been sewn onto clothing. Other common artifacts include stone beads, shell and terra-cotta bangles, and stone tools, as well as coiled basketry, known from an impression on a ground surface at Harappa (11).

Some settlements show signs of specialization in particular crafts or other industrial activities, such as the procurement of raw materials. For example, huge quantities of figurines were produced at Mehrgarh in this period, suggesting mass production. Lewan, a village in the Bannu Basin in northern Baluchistan, specialized in the production of stone tools, including querns, axes,and hammers, which were traded over a wide area. A degree of special- ization had begun earlier, for example at Mehrgarh, but it was becoming more pronounced in this period.

Some settlements of this period, including Rehman Dheri in the Gomal Valley and Kalibangan in the Ghaggar Valley, were surrounded by a substantial wall; in the river valleys these seem likely to have been flood defenses. A large platform was constructed at Mehrgarh, associated with a buttressed wall. Houses were generally of mud brick, often with stone foundations. Within some sites, standardization was already often present in the form of standardized brick sizes; at Harappa these were in the ratio 1:2:4, while at Kalibangan the ratio was 1:2:3 (11).

Another notable feature is the appearance of the 'horned deity' at a number of places. He is painted on a jar found at Kot Diji and on several jars found at Early Harappan Rehman Dheri, in contexts dated *ca.* 2800-2600 BC. All this suggests that the process of 'cultural convergence' was also operating in the religious and symbolic spheres.

Apart from the fact that some features of the mature Harappan culture were already in place in the Early Harappan phase, what is also visible is a gradual transition from a variety of regional traditions towards a level of cultural uniformity cutting across regions, a process that the Allchins call 'cultural convergence' (12). Some inferences can also be made about the social and political processes that were underway. Specialized crafts imply specialized craftspersons, trade implies traders, and planned settlements imply planners, executors, and laborers. Seals have been found at Mehrgarh and Nausharo and may have been connected with traders or elite groups.The discovery of symbols similar to Harappan writing at Harappa and some other sites shows that the roots of the Harappan script go back to this phase (11).

The Transition (2600-2500 BC): The Early Indus period had seen the agricultural settlement of a large part of the Indus Basin and the emergence of a few settlements that were probably towns. In a short period of around a century or a century and a half from 2500 BC, these settlements and the

society of their inhabitants underwent a radical transformation, resulting in the emergence of the Harappan Civilization, a complex and highly organized society. Many changes, for example in craft specialization, were more of degree than of kind, but there were also significant innovations and transformations, such as the emergence of writing and the beginning of sea trade. While the transition was complete in some areas by 2500 BC, in others, such as the eastern region, it is probable that the Mature Harappan period started later.

More than three-fifths of Early Indus settlements, such as Balakot, were abandoned during the transition: In Cholistan, for example, only four out of the thirty-seven sites identified continued to be occupied (but never "matured" into an urban culture). Many of the excavated towns were destroyed by fire: These included Kot Diji, Amri, Nausharo, and Gumla. Kalibangan was also abandoned but here an earthquake was the probable reason for the town's destruction and abandonment. Some of these towns were replaced by new settlements in the same location, sometimes in a short period of time, sometimes after two or three generations, but most of the earlier settlements were not reoccupied. Instead, there were a great many new foundations, including more than a hundred and thirty in Cholistan. Those established in Sindh possibly included the great city of Mohenjo-daro. (There is disagreement on the date of the waterlogged earliest levels there, known only from small soundings, though the pottery from the earliest levels is probably of the Kot Diji period.) An important exception to the general pattern was Harappa, which, far from being abandoned, enjoyed continuous development from the Kot Diji period into the Mature Harappan period, during which features characteristic of the Harappan Civilization gradually emerged (14).



T **here is strong archaeological evidence that in the Early Harappan phase oxen were used to pull the plough. This evidence for plough agriculture most distinctly comes from the**

pre-urban level of Kalibangan where a ploughed field has been unearthed

Many of the new settlements seem to have been constructed according to a plan, with wide, cardinally orientated streets, brick wells and drains, and well-appointed houses using bricks made to a standard size. In the larger settlements, baked brick was frequently used for construction as well as mud brick. Often these settlements had a surrounding wall; for example, a substantial mud brick wall was constructed around Nausharo, which seems to have taken over from Mehrgarh, now abandoned, as the regional center of the Kachi plain. Kalibangan was transformed from a single-walled settlement into a town with an elevated mound (citadel), divided into two walled sectors, and a lower walled town to its east, an arrangement found in a number of other Indus settlements. Mohenjo-daro was

constructed in part on massive clay and mud brick platforms, as a defense against the prevalent risk of flooding. Platforms were also constructed at Harappa and the town underwent considerable growth. At Dholavira in Gujarat, which had seen a small earlier occupation, a massive wall was built to enclose a new planned settlement whose residential area later expanded onto open ground north of the walled settlement. These three settlements suggest the emergence during the transition of regional centers, a higher tier in the settlement hierarchy. Another such center was founded at Ganweriwala, sited in the Ghaggar-Hakra plain equidistant between Mohenjo-daro and Harappa; unfortunately, because this has not been excavated, nothing is known of it except that it attained a size of 80 hectares or more during the following Mature Harappan period. Rakhigarhi, located in the Divide, is often cited as another regional center but there is no published report on it.

At the same time other signs of greater complexity were emerging. Within these cities and towns the range and sophistication of craft activities greatly increased, and there are indications of developing specialization. The development of special craft objects, of exotic or rare materials or of fine or time-consuming workmanship, and the appearance of artifacts ideologically endowed with special significance reflect increasing status differentiation. New styles and varieties of artifacts appeared, including metal vessels, and bronze came into widespread use. At the same time the various regional styles of pottery and other artifacts were superseded by standardized Mature Harappan products after 2500 BC.

Some regions were less closely integrated: The inhabitants of Saurashtra and the North Gujarat plain (“Sorath Harappan” of Possehl) and southern Baluchistan (Kulli culture) maintained their own character, showing some significant differences from the classic Mature Harappan culture in Sindh and other core regions. The rest of the borderlands formed no part of the Indus realms. Kot Dijian material continued in use (Late Kot Diji period) in northern Baluchistan, where Rehman Dheri flourished as a regional urban center, and was quite distinct from the culture of the

plains. Mundigak became part of the Helmand culture, and the major route through Central Baluchistan, which had linked the Iranian plateau and Turkmenia with the Indus plains, was abandoned. At Kalibangan, the coexistence of the two is unmistakably documented.

One of the key developments of this period was the emergence of a writing system. Seals with simple designs had been used in the Early Indus period, when there had also been marks made on pottery: Both are likely to have been connected with administrative or organizational functions. During the transition period, however, this simple range of signs developed into what is generally taken to be a complete writing system. This script was used on seals that now bore an inscription and an image, drawn usually from a limited repertoire of animal representations.The development of seals and writing suggests the emerging need for more complex administration and record keeping.

Apart from the fact that some features of the mature Harappan culture were already in place in the early Harappan phase, what is also visible is a gradual transition from a variety of regional traditions towards a level of cultural uniformity cutting across regions, a process that the Allchins call 'cultural convergence'. Some inferences can also be made about the social and political processes that were underway. Specialized crafts imply specialized craftspersons, trade implies traders, and planned settlements imply planners, executors, and laborers. Seals have been found at Mehrgarh, Nausharo and Harappa and may have been connected with traders or elite groups.The discovery of symbols similar to Harappan writing at Harappa, Rehman Dheri, and Balakot shows that the roots of the

Harappan script go back to this phase.

Explaining the Transition: Many features characteristic of the Harappan Civilization were known by the Early Harappan period in some towns: cardinally orientated streets, baked bricks, substantial walls, skilled and partially specialized craftsmanship, and the rudimentary use of signs to indicate ownership or for administrative purposes. In addition to villages and pastoral camps, there were a number of towns, probably providing goods, services, and organization for the villages in their area. But their influence did not extend far, and regional styles of pottery and other artifacts indicate the existence of a number of different groups and traditions. These interacted with each other and with neighboring cultures in Pakistan, Kashmir, and the Iranian plateau. Over a few generations, the majority of settlements were destroyed or abandoned or rebuilt on a greatly expanded scale and to a grander plan, with wide streets, brick drains and wells, and substantial surrounding walls, and the number of settlements increased enormously, most of them being new foundations. In addition to camps, villages, and towns, there were now cities. Urban settlements housed artisans in a widened range of crafts, often practicing more specialized craft skills and engaging full-time in these activities. The simple seals and potters' marks had developed into a writing system, used on seals that were widespread. Regional artifact styles had been largely superseded by uniform and high-quality products throughout the Indus basin, reflecting cultural and possibly political unity. Overland interactions with neighboring cultures increased in some directions, with integrated trade and procurement networks, which were added to and in some areas replaced by overseas trade to Oman and other lands bordering the Gulf.

But how did this convergence come about! What led to the transition from the porto-urban Early Harappan phase to full-fledged city life? Was it the result of increased inter-regional contact, or longdistance trade? Trade with Mesopotamia has been suggested as a factor, but the importance of this trade has been exaggerated even in the context of the mature Harappan phase. According to Chakrabarti (13), the catalyst for the transition may have been an increasing level of craft specialization, instigated especially by the development of copper metallurgy. He suggests that another crucial factor for the spread of settlements in the active floodplain of the Indus may have been agricultural growth based on an organized irrigation system, but direct evidence of this is lacking The answer may be in the emergence of a new, decisive political leadership, Significant changes in social organization, or perhaps a new ideology. Unfortunately, such changes are difficult to deduce from the archaeological data (11).

An understanding of how and why these changes took place is still elusive. The evidence of fiery destruction at many sites has been interpreted by some scholars as the reflection of warfare, although there is no other evidence to support this, such as weaponry among the artifact assemblage. Evidence of violent death might be sought among funerary remains but these are too limited to be helpful. An alternative explanation is that the deliberate destruction of old settlements and the creation of new ones following certain principles, such as the cardinal orientation of streets and the emphasis on water supply and sanitation, reflect the widespread adoption of a new ideology, which was to underlie the unity and considerable uniformity of the Indus civilization. In this scenario, rather than reflecting enemy action, the destruction by fire of the settlements was an act of ritual or ideological purification. Indeed some scholars suggest that the Indus civilization was not a single state but a collection of smaller independent polities unified by this shared ideology, a hypothesis that has its attractions.

While the widespread rebuilding and relocation of settlements are peculiarities of the Indus Basin,

many of the other developments, such as craft specialization, the implied emergence of a social hierarchy, and writing, are features that generally characterize the civilizations that emerged in various parts of the world from the late fourth millennium onward. These features reflect the growth of urban societies based on the production of an agricultural surplus and involved in trade and internal distribution networks to obtain and circulate essential and luxury goods, some of which were emblems of power for the emerging elite or symbols of prestige for the urban centers and their gods. The stimuli behind the transformation of the cultures of the Indus Basin into an integrated urban civilization are still as much the subject for debate and speculation as they were when the civilization was first discovered.

Most of the excavations are confined to the Harappan cities, which were planned to a large extent. This obviously has an in-built abruptness. The recent evidence from Harappan excavations and a large number of C^{14} dates that are available help us to understand this genesis in a proper perspective now. If we take into account the total matrix of the Pre-Harappan cultures on which the Harappa culture was implanted and take a dynamic view of the cultural processes, the problem of the Harappan origins becomes easier to understand.



Conclusion: Based on the present evidence from excavateons and surveys, it seems clear that a continuous expansion of settlement of the Indus plain led to the urbanism that began at around 2,500 B.C. Many of the advances, involving

developments in agriculture and pastoralism, community layout, craft production, and exchange systems for procurement of raw materials and finished goods were important components of the Urban period and they were already apparent in the Early Harappan sites. As we proceed in discussing the material culture of the Harappan Civilization in the following chapters, this chapter should serve as a reference point for change as well as continuity.

There are several gaps in our understanding of the relationship between the early and mature Harappan phases. The information about the earliest levels at sites such as Mohenjo-daro and Harappa is inadequate. There are several mature Harappan sites where there is no early Harappan level. There are several early Harappan sites in the Pothwar plateau which do not have mature Harappan levels. In Cholistan, only three of the many Early Harappan sites continued to be occupied in the mature Harappan phase. Further, there are only a few Early Harappan sites in the active Indus plain. And at sites where there are both early Harappan and mature Harappan levels, the transition from one to the other is not always smooth. At Kot Diji and Gumla, a burnt deposit between the two suggests a major

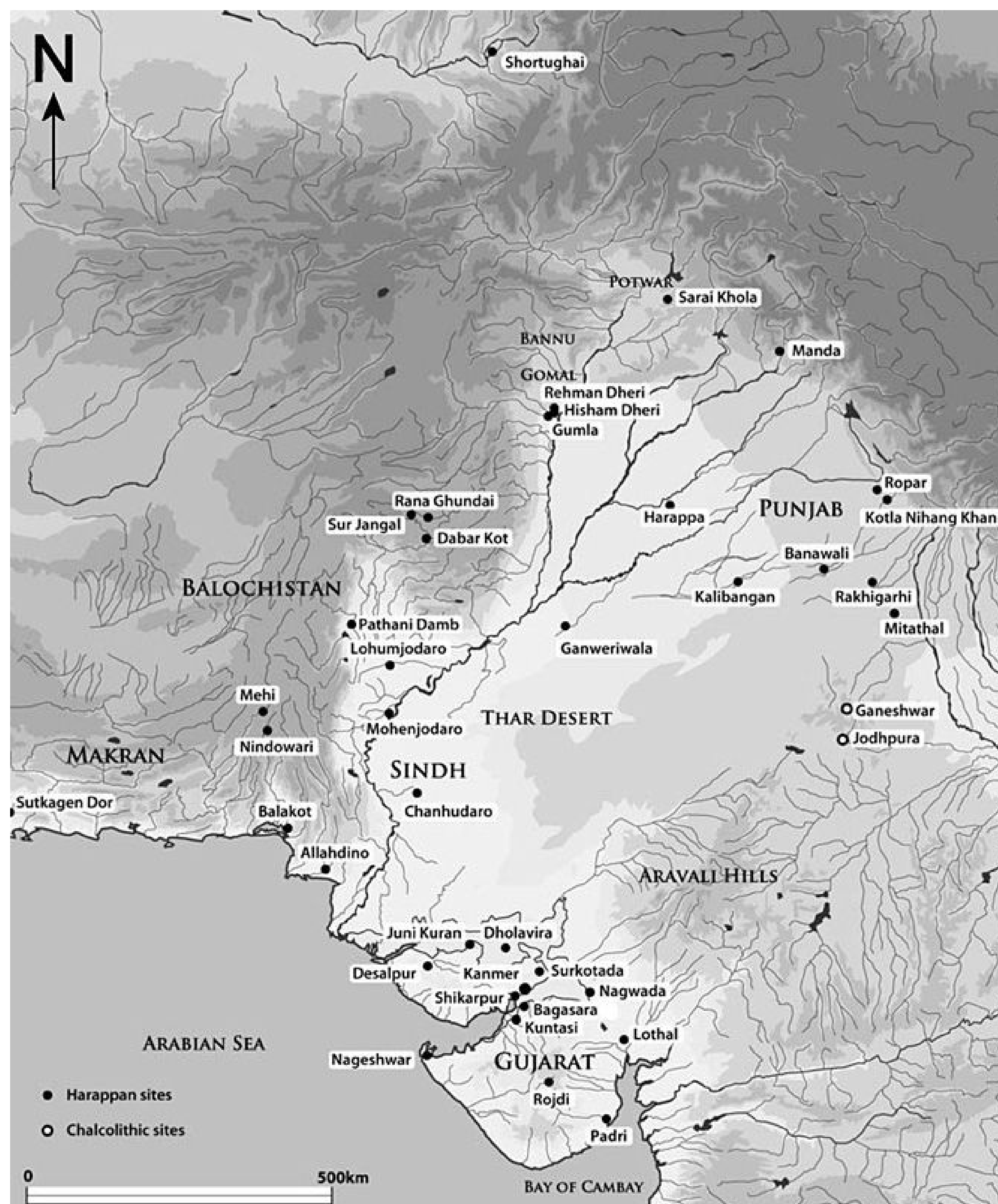
fire, the significance of which is not known.

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Chapter 6

Settlement Pattern



In the preceding chapter, we discussed the development of increasingly large settlements and an expansion of population throughout the Greater Indus Valley. Keeping pace with these changes were modifications in the physical layouts of settlements, intensified cultivation of agricultural crops, and diversification in animal husbandry. Similarly, stylistic and technological changes in the crafting of material culture took place with time. In relating these changes, we emphasized local differences, but at the same time, recognized a hint of the emergence of common ideas with respect to community organization and stylistic preferences. The establishment of settlement linkages through trade and exchange is visible in the flow of resources and movement of goods. This likely enhanced and fostered the spread of ideas, as did the forms of artifacts and the diversification of raw material. New

modes of transportation and the age-old pursuits of nomadic pastoralists must surely have helped in such a wide distribution of technology and the ensuing material culture.

As impressive as these developments are, they were relatively small in scale when compared to the radical social and material changes that culminated in the formation of an urban civilization that began in 2500-2600 B.C. and addressed in this chapter as well as in those that follow. At the very least, we are now dealing with the development of five large cities, along with an increase in the number of sites from a total of 463 in the Pre-urban period to a number between 500 and 1000 in the Urban period (1). A few of these settlements grew into town and still fewer attained the status of a large city, but the rest remained argo-pastoral villages that were the backbone of the economy of regional urban cities, like Mohenjo-daro, Harappa and Ganweriwala.

One of the key questions regarding these changes in the Harappan society pertains to the changes in spatial distribution of population over time as identifiable by archaeological artifacts. Of concern are not only the individual settlement structures, but also the general pattern of the settlement and the structure of their interconnection within the settlement network. It would appear that this task should be quite easy with more than 1,000 known sites within a territory of over 1 million sq km in area. Alas, it is not the case.

Despite a wealth of knowledge that we have accumulated during the past century about the geographic extant of the Indus Civilization, or perhaps because of that, the distribution of Harappan settlements has somehow become quite a controversial subject. The main reason is the lack of a coherent definition of the term ‘Harappan’. Even if such a definition is sometimes attempted and promulgated, no one seems to adhere to these simple guidelines. Indian scholars are particularly prone to this disregard of the convention, and some of this practice is deliberate. It is through this confusion that they can continue to make this once dead civilization continually expand - of course, towards the east. As a consequence, a large political content has lately seeped in and the whole subject has become contentious. Nevertheless, a clear view can be developed if one leaves behind the muddled claims of certain ultra-nationalist individuals in India who have cropped up on the scene during the past 50 years.

One of the important aspects of Indus Civilization is the apparently rapid expansion of the Harappan settlements and their proliferation over great distances: from the Hindu Kush area of the northwest Afghanistan to the borders of Gujarat in the southeast and from the Iran-Pakistan border in the southwest to the Indo-Gangetic Divide in the northeast. It is of interest to look at the distribution pattern of these settlements in the core area, their spread into peripheries, their relationship with the ‘foreign’ outposts, and above all, the mechanisms operative behind this expansion. This is, however, not an easy task: the available data is sufficient to draw definite conclusions but the obstacle is the misuse of the term “Harappan”: it has recently been blurred to such an extent that in some instances one is not really certain of what is meant by the term. As stated earlier, the number of the “Harappan” sites is daily increasing in India and the boundaries of this once dead civilization seem to be expanding by leaps and bounds. Even its good name is changing from the Indus or Harappan to “Sindhu-Sarasvati”, or “Sarasvati-Sindhu” civilization.

The settlement pattern is still a topic of ongoing research. There is certainly a vitality to the initiation of new research, more in India than in Pakistan, if the number of reports on recent field work are an indication. At the same time, there is a tendency on the part of some Indian archaeologists, to continue

repeating a number of facile but utterly misleading statements such as ’there is a larger number of settlements in the Sarasvati region (the GhaggarHakra river bed) than all the sites found in the Indus Valley combined’ or ‘judging from the settlement density, it appears that the focal point of the Indus Civilization must be the Sarasvati plains’. Thus, while some valuable data is forthcoming, the field is increasingly being filled by a large number of unverifiable “finds” and questionable “ new discoveries”. This confusion notwithstanding, the broad outlines of the core Harappan geography are easily discernible. What has become debatable in recent years is the eastward expansion of the Harappan settlements.

Our evidence on the subject comes from the various archaeological surveys and excavations which have been undertaken during the past 80 years or so: the excavation of Harappa, Mohenjodaro and several other sites form the core of this evidence. Regional surveys have built up a general picture of the distribution of Indus sites and their relationship to the landscape. For example, Harappa was found to be virtually the only sizable Indus site in the Punjab, suggesting that Harappa's situation could relate to its importance in trade, particularly in timber from the Himalayas, and pointing to the essential role of pastoral nomads, then as now, in providing links between settled communities.

The types of material collected from the surface of surveyed sites, mainly potsherds but also industrial debris such as kiln pieces, copper slag, or flint chips, give some clues to the variety of activities that took place at each. At some sites, the ruins

Another obstacle is the misuse of the term

“Harappan”: the definition of the “Harappan” has recently been blurred to such an extent that in some instances one is not really certain of what is meant by the term. The number of the “Harappan” sites is daily increasing (in India, particularly), and the boundaries of this once dead civilization seem to be expanding by leaps and bounds. Even its good name is changing from the Indus or Harappan to “SindhuSarasvati” or “Sarasvati-Sindhu” Civilization.

of mounds survive, and surface examination can reveal some architectural clues. However, a survey alone is limited in the information that it can yield. A large number of sites has vanished altogether, victims of relentless encroachments in the wake of agricultural expansion and modern settlement activities; still more hidden from us as they lie buried under the alluvium.

So far, most of the attention of archaeologists, anthropologists and prehistorians have been on Harappan cities. They were exciting to dig and enamoring to describe; small towns and villages have been largely neglected. This situation is, however, changing fast as scholars working in the Greater Indus Valley have finally started to pay attention to the Harappan settlements as a whole and some even have begun to connect the Harappan settlement pattern to the environment prevailing at the time in the respective geographical regions. It is being realized that concentration on cities alone is only half the story, since large segments of population lived outside of them.

Although many city inhabitants most likely had agricultural fields and kept animals, the products of farmers and herders living in rural areas were necessary to sustain specialists living in cities who were not food producers. Cities were centers of commerce and served as meeting places for the exchange of goods among urban and rural populations. The sustaining networks of small settlements provided strategic links for the movement of goods and the development of trade networks and craft products not produced in cities. Thus, to understand the degree to which Indus cities were integrated

with their countrysides, we need to return to the regional settlements introduced in the last chapter. In this chapter our principal focus will be on

the Harappan settlement pattern as a whole, taking special note of some of the agricultural villages that dotted the Greater Indus Valley during the Harappan Civilization, ca. 2600-1900 B.C. This is done in context with the emerging urbanism generally and increased modifications to the landscape that included new conceptions of community planning, corresponding increases in scale of economic specializations in agriculture, pastoralism, and craft production, as well as trade and exchange, the development of regional exchange networks, and the creation of trading outposts all key elements of the civilization. The Harappan cities and some sizable towns - we shall deal with them separately.

The emergence of the Urban Phase brings change. First, there is a significant increase in the number of sites. Some of this increase comes from the new Harappan settlement of Gujarat, both Kutch and Saurashtra, as well as the integration of the Kulli Complex of Baluchistan into the greater Harappan urbanization process. But, in Bhawalpur, already well settled with 40 sites during the Preurban Phase, there is a jump to 174 in the Urban Phase. According to Possehl's estimates, the total settled area increases from 256 hectares in the preurban to 930 hectares in the Urban Phase.

Extent and Distribution of Sites: According to published reports, there are more than 1,000 settlements of the Harappan Civilization known today. This estimate includes all those "Indus" or "Harappan" sites which have been recently discovered by the archaeologists of post-Independence India and by their underlings working at various universities and state-run institutions. The veracity of most of these findings in the Indo-Gangetic Divide and Gujarat is doubtful on two counts. First, most of the sites reported may not have anything to do with Indus culture of any sort: the find of a piece of Indus pottery sherd on a raised surface does not make it an Indus site. Second, most of the proven "Indus" sites are "Late Harappan" which is a code name in Indian archaeological literature for post-Harappan. Out of 400 "Harappan" sites examined by some independent observers, only a few were found to belong to the Mature Harappan period. The Possehl's estimate (1) of Mature Harappan sites also includes the Kulli Complex of Baluchistan, which other archaeologists generally tend to exclude.

Keeping in view of these ambiguities and having cognizance of the absence of proper archaeological reports in most cases, one can probably assume that a total number of about 500 Harappan sites would be closer to the truth. Of these about 400-450 are on the western side of the IndoPak borders and the balance are in the IndoGangetic Divide, Kutch, and Saurashtra in the present day India. These settlements range from tiny places one-tenth of a hectare or less in size, to the reported size of Mohenjodaro, Harappa, and Ganweriwala, all three in excess of 150 hectares. About one hundred of the total Indus sites have been examined by excavations. These Indus settlements tend to cluster, with the open space between them occasionally filled with a few individual settlements. Possehl suggests (1) that the open space was probably occupied by nomadic people, hunter-gatherers and pastoralists or marginal agriculturists.

Alongwiththedoubtfulnumberoftotal Harappan sites, the reported area of individual sites, whether in Pakistan or across the border in India, should also be taken with a grain of salt. These are just estimates and different archaeologists have used different criteria for the estimates. For example, the size of Mohenjo-daro has been reported as small as 100 and as large as 250 hectares. The same applies to Harappa and several other sites. While there are large cities and towns, some of the best-

known places are actually quite small (Lothal at 4 hectares, Chanhu-daro at 5 hectares, for example).

Out of all the discovered sites, only half a dozen are cities and slightly more than a dozen can be identified as towns. Rest of the settlements fall in different categories like small or big villages, processing centers, ports, and temporary camps for exploitation of local natural resources. A glance at the research strategy adopted by the Harappan archaeologists reveal that baring the site of Ganweriwala all the Harappan cities have been excavated on large scale, producing large quantity of data on various aspects like town planning, trade, social, religious and economics. It represents less than even 3% of the Harappan population. Thus, we have very little idea of their rural lifestyle, where more than 97% Harappans lived. Very few small Harappan sites have been subjected to large-scale systematic excavations. In fact there is a need to systematically identify and document different categories of Harappan sites and a number of sites in each category needs to be systematically excavated on large scale which in the real sense will give a holistic picture of the Harappan life and history.

There is an expectation that small sites were villages or pastoralists' camps, but some on excavation have proved to be centers of industry, trade, or administration, while a number of larger settlements were villages rather than towns. Thus, the size of a settlement is not an adequate guide to its complexity. The settlements occupied over a long period, and especially those that were relocated within a short distance, can result in a spread of material over an area far larger than that occupied at any one time; this effect is exemplified by the long-lived settlement of Mehrgarh, which moved its area of occupation several times within the same vicinity. Manure containing domestic debris may be spread onto fields around a settlement, giving a false impression of the latter's extent, and later disturbance and reuse of building materials can produce a similar result. Seasonal occupation by pastoralists outside a town may also result over the centuries in a spread of occupation debris over an area far greater than that occupied in any one year.

From the distribution pattern of sites of the Early Indus genre, it would appear that the limits of the ecological zones adopted by the Harappans in the Indus basin were already known to their Early Indus predecessors. This is evident by the occurrence of the Early Harappan sites up to Gumla, Sarai Khola, and Rehman Dheri in the Indus basin and a chain of Early Harappan sites along the ancient course of the Ghaggar-Hakra. This means that Harappan settlements remained confined to mostly the same general area where most of the Early Harappan sites have been found. All in all, the Harappans flourished within the areas which their predecessors considered as their home.

Not only that the Harappans remain confined to certain geographic areas known to their ancestors, the pattern of earlier contacts and communication also remained intact: the older communication routes with the west were maintained and new communication routes, especially to the east, were opened but merely. This is an important point to note in order to understand the settlement pattern of the Harappan people and their relationship with the earlier, pre-urban, cultures of the region.

Settlement Hierarchy: The relative size of the Harappan settlements and their location may offer some clues to the organization of their society. First, there are very few enormous settlements, the cities. These are at least 60 hectares in extent and could be as large as 250 hectares (Mohenjo-daro, Harappa, Ganweiwala, Dholavira, and probably Rakhigarhi), four of them have been investigated at least to some extent; Rakhigarhi and Ganweriwala have been identified but require investigation to confirm their extent and nature.These cities were spaced fairly evenly throughout the Harappan realm

and were separated from each other by 280 to 600 kilometers. It is interesting to compare this arrangement with that in Sumer where the cities were far more numerous and were situated only about 20-60 kilometers apart, distributed lineally since they were confined to the narrow floodplain of the Euphrates.

At the opposite end of the spectrum were rural settlements: farming villages, pastoralist and hunter-gatherer camps, and fishing villages. These could range in size from less than a hectare to 7 or 8 hectares. Their inhabitants were essentially primary producers of subsistence products who would also have undertaken domestic crafts such as weaving and woodworking. In addition, there were villages whose inhabitants were specialists, such as the shellfishers and shellworkers of coastal areas. These settlements had none of the complexity of towns but were probably not self-sufficient in subsistence products like villages. They may have been occupied only seasonally by people who spent the rest of the year in primary production.

The third category, towns, is an amorphous catch-all, including a great diversity of different types of settlement. They were usually quite small, around 1 to 5 hectares, and, though some were larger, few exceeded 16 hectares. This figure does not include the suburbs that may have existed outside many towns; traces of suburban settlement have been reported outside a few and are suspected at others, but none has been properly investigated. While towns resembled cities in that they housed officials, traders, and other occupational specialists and probably provided services for the people of their area, the majority were also specialist centers. Some, such as Balakot, were centers of craft production; others were ports, like Sutkagendor, or trading centers, like Shortugai. However, they shared certain features: they were all, to a greater or less extent, involved in craft production, usually of a specialist nature, making goods from local materials or materials brought there from a connected region, for distribution within the entire region and sometimes also for export; they all played some role in the internal distribution network, including storing goods and materials for onward transmission; and those on the periphery were located to fulfill a role also in the procurement of goods and materials from external regions. They were all small enough to be supported by the produce of their hinterland and probably all included primary producers, such as farmers and fishers, among their inhabitants, particularly in the suburbs from which these people could have easy access to their fields or to the rivers or coasts.

A number of attempts have been made in the past to classify the Harappan sites of diverse settlement areas and put them in some type of hierarchical order. However, these sites are not amenable to any useful classification and, in spite of an all out effort, no one has successfully demonstrated that the settlements of the Harappan people can be rationalized into a three- or four-tier system that is hierarchically arranged. There are three large sites in the 80-85 hectare range (Mohenjo-daro, Harappa, and Ganwariwala). There is then a gap in settlement size, with the next largest settlement being the Kulli site of Nindowari at 50 hectares.The three large settlements area so nicely spaced within the Harappan domain, with Ganwariwala almost exactly centered between Mohenjo-daro and Harappa. Based on this observation there is good reason for us to see two tiers of Harappan settlement, with three regional centers or "capitals" developing as a part of the emerging Urban Phase

Talking in generalities, the apex of the settlement hierarchy, if there is one, are the principal cities of Mohenjo-daro, Ganweriwala, and Harappa, all in the 100-150 hectares range and located at roughly equidistant positions along the length of the Indus basin. The area within this triangle is generally taken as the core area of the Harappan Civilization but the settlements outside this triangle are equally

important and not necessarily outside the ’core’ area of the Civilization. Rakhigarhi, in the Indo-Gangetic Divide, is often mentioned as a large excavated Harappan city but no archaeological report has so far been made available. The area enclosed by a line joining the outermost sites at which the material culture of this civilization has been discovered is little less than half a million square miles, somewhat larger than modern Pakistan at 340,000 sq.miles, not over one million square miles as commonly and misleadingly stated.

For some unknown reasons, attempts are sometimes still made to fit the Harappan settlement pattern in the mold of Mesopotamia, where a threetier pattern is evident. Such a focus has, consequently, hindered the development of new thoughts. The Harappan settlement pattern seems to indicate that both towns and villages were tributary directly to their local domain capital (city), links between them being maintained by pastoralists. Towns also acted as funnels through which local goods were channeled toward the city. The impression gained by this settlement pattern is very different from the village-town-city hierarchy familiar from Mesopotamia, in which villages looked to their nearest town for manufactured goods and services and in turn provided the town with subsistence products, while the city provided overall administration, specialist services, and specialist industries, whose products reached only the elite of the towns in its territory, from which it received subsistence produce. The apex of this food chain pyramid of replicated units was a capital to which all the rest of the settlements were politically, socially, and economically subordinate.

.... the find of a piece of Indus pottery sherd on a raised surface does not make it an Indus site.

proportionality is, however, not valid in all cases and an absence of any signs of settlements does not necessarily negate the presence of population. For instance, take the paucity of settlements in northern Punjab, the Pothwar and the Salt Range. Does this mean that this region was devoid of any habitation or does it mean that the habitants were simply nomadic which did not leave any signs of settlement behind? Or take the example of the alluvial plains of Sindh. While the most important cities of the Indus Civilization are located in this area, the site density gives the impression as though the area was largely unpopulated.

Now, did the Indus cities exist without a dense structure of supporting villages or most of the settlement sites have been covered by the accumulating alluvium throughout the centuries past? In some regions settlement traces have been eroded away, so the picture obtained from surveys is not complete and often misleading. It is strange, however, that this point, so obvious and so basic, does not even get a fleeting attention in the discussions on settlement density and habitational pattern of the Harappan villages and towns.

The Harappan state, if it can be called a state, in contrast, was more akin to a body: a single functioning entity composed of a number of different and complementary units, each with its own particular function within the whole. The head, limbs, organs, and other parts of the body equate to farming villages, pastoral camps, trade centers, huntergatherer camps, fishing villages, procurement centers, processing centers, and other types of Harappan settlement. As parts of the body are made up of cells, sharing the same basic biological elements but often specialized in function, so the Harappan settlements were made up of people who were occupational specialists, including officials and priests, as well as farmers, pastoralists, fishers, artisans, and traders, their composition depending on the function of the settlement. To continue the analogy, the internal distribution network was the circulation system that ensured that all the things necessary for life reached all parts of the body, the

Harappan society at large. Whether this had one head (Mohenjo-daro or Harappa), two, five or more is not yet apparent, but clearly this society was unusual for its time in how it operated. Certainly, it was not a replicate of Mesopotamia.

Population Density versus Settlement Density: Settlement density of the Harappans is increasingly becoming one of the hottest topics of research and speculation. As is evident from the above, a great deal of the settlement evidence comes from the number of Harappan sites in a given area and a direct relation between the settlement density and the site density is often assumed. For example, the huge concentration of sites along the Ghaggar-Hakra River gives the impression of large population density in that area and there cannot be any doubt about this conclusion. This direct

The area enclosed by a line joining the outermost sites at which the material culture of this civilization has been discovered is little less than half a million square miles, somewhat larger than modern Pakistan, not over one million square miles as commonly and misleadingly stated.

The equating of site density with the settlement density has led to several lopsided analyses of the Indus settlement pattern. For example, the site density in semi-arid zone along the GhaggarHakra River, which is the highest in the Indus realm, is often contrasted with that of the relatively low density in the fertile alluvium of Sindh and Punjab. On this basis, the ‘center’ of the Indus Civilization is simplistically shifted to the banks of the GhaggarHakra river. Some of this reconstruction of history is, of course, deliberate and no amount of arguments would satisfy this missionary zeal. Possehl has discussed this topic in some detail in his monumental book, *the Indus Age—The Beginning*, an edited summary is offered in the followings.

The study of settlement patterns is a welldeveloped part of archaeology, and professionals are aware of its strengths and weaknesses. The method’s strengths are obvious. However, the method does have weaknesses, especially when it is applied to the alluvial plains of the river valleys. In fact, settlement patterns, as judged from the site density, in these regions could easily mislead the investigator. An example is the large number of Indus settlements found by M.R.Mughal in Cholistan within a period of a few years compared to the number found in the alluvial plains of Sindh discovered over the past full century. These lopsided settlement numbers in no way mean that the Cholistan was far more populated than Sindh in the Harappan times. We know intuitively that the actual center of population was in the alluvial plains of the Indus rather than the marginal lands of semi-desert. In this instance, the data reflect only the fact that the settlements in the arid or semi-arid basin of dried-up Ghaggar-Hakra river system would be more visible and accessible than the settlements in the plains of the Indus as the alluvial deposits, year after year, have buried these settlement below the earth and made them invisible for exploration. Furthermore, the rapid expansion of the irrigated agricultural land has long time ago devoured the sites that might have been accessible at some point in time in the past.

There are a number of agencies that remove sites from the natural landscape. Wind and water erosion, burial by natural alluvium, and excavations by humans seems to be the most important. The effect of these agencies on settlement archaeology is difficult to ascertain, but they are a factor that distorts the historical record. For the archaeology of the Indus plains, the Indus River and its tributaries have to be seen as vigorous streams. Indus River has changed direction many times over the millennia that separate the modern-day archaeological explorer from the once lively settlements of the Indus Age. Any archaeological site in the path of a major course change would clearly experience a disturbance of some magnitude and smaller sites could have been completely removed

by erosion. The same is true for the rivers of the Punjab. The smaller settlements, situated on the lower ground within the meander entrenchment, could have disappeared, eroded away or covered by alluvium. Even smaller rivers take their toll. It is known, for instance, that the Bolan River has taken a substantial chunk out of the eastern side of Mehrgarh.

We know that there is archaeological material to the depth of about twelve meters below the ground surface surrounding Mohenjo-daro. Part of this depth is due to the accumulation of silt from annual inundations around the city, but there are other Mature Harappan sites in this same alluvial environment that are well above ground (e.g., Lohumjo-daro, Chanhu-daro, Jhukar, etc). Some might even be sitting on an original ground surface. It can be concluded that alluvium does not accumulate in an even way that buries all sites, nor does erosion work in a way that necessarily removes all of them.

In the absence of alluvium accumulation, the desert country could experience the movement of sand dunes by the forces of wind. The moving dunes could cover the remains of a settlement quite deep below its surface. It can also expose the others. If a sand dune covering a site gets “fossilized”, as scores of them are found in Cholistan, they permanently shield the site from observation. The exposed sites, on the contrary, become readily visible as M.R.Mughal found them in Cholistan, Fairservis in Siestan, and Stein in Baluchistan. The proportion of the hidden and exposed sites, obviously, would depend on the movement and intensity of sand dunes, their sizes, and their propensity to fossilization. Thus, even if it is conceded that hundreds of sites discovered in the Ghaggar-Hakra basin in Northern Rajasthan are “Harappan” in nature, it still does not tell us with any certainty that this area was more populated in the Indus time than the others.

The soils of an archaeological site are rich in fertilizer, phosphates and nitrates, generated by humans and animals as a by-product of habitation. Farmers know this and all over the world they are fast at work removing soil from sites and taking it to their fields as free fertilizer. Louis Flam has reported that the famous site of Lohumjo-daro has been completely removed by farmers and that the same is true for Deh Mari Sabra near Chunhu-daro in Nawabshah District.

The lesson derived from this discussion is obvious: one cannot and should not compare the population density of one region with that of another region based on the sites density alone if the geographical and climatic conditions of the two are as divergent as those of an arid land and an alluvial plain. It is unfortunate, that the statistics of the Ghaggar-Hakra sites are still being considered as synonymous to the population densities of the bygone days. Even some of the otherwise respected archaeologists are guilty of this implicit assumption. For example, Chakarabarti would write the followings:
“On the basis of the sheer density of site distribution, both in the classic Harappan and earlier periods, the core area of the growth of the Indus civilization seems to be the explored Cholistan section of the Hakra plain. Significantly, they all lay in an area which measures, along the Hakra course, only about 200 km and not more than 50 km at any point across the breadth. Once it had developed in this apparently limited area, it was not at all difficult for this civilization to come down, along the Hakra, to Kutch first, and then to Saurashtra. It should also have spread quickly to the Hakra-Indus Doab including the Mohenjodaro area, as Mughal's map suggests” (23).

In summary, archaeological sites can provide us with valuable information about the settlement pattern if studied with other evidence but if the site density is taken as a measure of population density

without taking into consideration other mitigating circumstances, a comic situation is bound to arise as is seen in the above quoted example.

Settlements in the Punjab: Possehl has highlighted several aspects of Harappan settlement patterns in Punjab as they relate to the emergence of the Urban Phase of the Indus Age, that is, the Harappan Civilization (2,3,4). A more recent overview and original research comes from Rita Wright (5), who, along with her associates, surveyed the flood plain of the Beas. There is also a modest body of literature which deals with this topic in generalities and there is therefore little need for an extensive review of either the survey data base or the current status of settlement archaeology in this region. We shall, however, focus on one or two issues which have been raised in these studies, especially those by Wright and associates (5).

In Punjab the Harappan sites are found in the *Bari Doab* (between the Sutlej and the Ravi). The west of the Ravi, sites are found sporadically but are focused around Sheikhupura, west of Lahore. The famous site of Harappa lies in this area. Further west, till the Indus River, there is no Harappan site in Punjab, which is in keeping with the arid conditions of the *Sindsagar Doab*, the area between the Jhelum and the Indus. There is no site in the *Chej Doab* (between the Chenab and the Jhelum) either. This paucity of sites is reflected in the map sketched at the beginning of this chapter and it is not as though there has been an absence of exploration in the region. There are a number of historic sites in the region; so are several Early Indus sites: Sarai Khola, Jhang, Musa Khel, Tikrial, Leiah, and a group of settlements discovered by A.H.Dani on the Gomal plain as well as in the Bannu area, but none is Harappan. On the Indus, a single site, less than 2 hectares was occupied during the Urban period.

Shereen Ratnagar (31) has pointed out that neither Harappa nor Mohenjo-daro are sited where we should expect the major cities to be, namely functioning as ‘central places’ in the midst of the most densely settled areas. On the contrary, both cities are marginal to the major agricultural clusters, to the extent that, where Harappa is concerned, ‘the nearest known cluster of settlements lies in Cholistan, some 150 kilometers to the south, with which, however, Harappa has good lines of communication. Accordingly, Ratnagar (31) postulates that both cities were in fact ‘gateway cities’ linked ‘by dendritic networks where lower level centers are tributary to only one higher level center - not to more than one as in central place systems.

In central place systems there are rings of settlements at varying radii from the centre. But here, ‘with primate cities functioning as “gateways” the networks connecting the settlement points are like elongated fans radiating from the primate city’ (31). As a ‘primate city’ is one that is many times larger than any other in the country, and thus dominates the rest economically and/or politically, it is logical that routes tend to converge directly upon the primate city (like railways and roads do upon London and Paris), rather than the primate simply lying at the centre of a web of routes connecting other cities and towns. ‘One may thus imagine a dendritic fan with its apex at Harappa. This fan spreads out from northwest to northeast, and in turn feeds the core Harappan regions in the lower Ghaggar-Hakra and Sindh’ (31). What it feeds them with includes lapis lazuli from Badakshan (via the Gomal Valley), deodar wood from the Himalayan temperate forests, pine wood from the Himalayan ranges east of Kashmir, copper and steatite from the Zhob Valley (32), gold from the upper reaches of the Chenab, and chert from the Salt Range and the Sulaimans.

This assessment, however, stretches the imagination a little too far. First, it is assumed that the known

and visible sites to us now in fact represent the actual population density or settlement pattern in the Harappan times. It is quite possible, rather most likely, that a number of agricultural and pastoral villages could have existed around Harappa but they are not now visible to us for reasons stated above. Second, we are seemingly ignoring the vast food producing potential around Harappa. Fentress (33), for example, has estimated that Harappa had in its immediate vicinity, notably in the Kamalia Plain, around 6,600 square kilometers of farmland for its own support, employing flow irrigation and exploiting low-lying hydromorphic (permanently damp) soils. Given the high levels of rainfall in the northern part of the upper Indus plain, which today ranges between 500 millimeters and 700 millimeters of dependable rainfall annually, Fentress (33) states that those plains north of Harappa were then covered in thick forest 'and could only have been inhabited by mobile pastoral groups'. Like the Deccan and other forested areas to this day.

Nevertheless, it seems reasonable to presume that there must be at least a few Indus village farming communities in Punjab. In fact, one can perhaps ascertain where they should be located. Harappa is found on a minor geomorphological anomaly within the entrenchment of the Ravi River. This feature is a finger of high ground which juts into the valley near the alluvium. The settlement was thus both close to cultivable land and more or less safe from floods. It seems reasonable to presume that other sites, which predominantly depended on agriculture for their livelihood, would be found in analogous situations: within the river entrenchment, but high enough to be safe from all but the most severe floods. As noted by Possehl in several of his writings (2,6), the sites of this type are unlikely to be located on the *bars* (high ground between the major rivers) of the Punjab, based on both the empirical evidence so far available.

Given the apparent absence of Harappan village farming communities and urban towns in the *bars* suggests one of the two possibilities; First, the area was completely uninhabited, and second, the area was inhabited but the population was largely nomadic pastoralists. It is hardly conceivable that the whole tract of land could have been devoid of people, especially when we see the presence of man in the western end of the area (the Pothwar plateau) for thousands of years before (7). The conclusion to be drawn, therefore, is that these *bars* were populated with people who were basically no



Distribution of Harappan Sites

madic pastoralists with only marginal interest in agriculture. This settlement pattern probably reflects the overwhelming importance of pastoralism in this generally arid region where cultivation would have been confined to the banks of the rivers (the Chenab, Jhelum, and Ravi) and their various tributaries which did not flood and enriched the surrounding land as did the Indus in the South.

Prior to the nineteenth century, when the British dug canals down the spine of the *bars* and subsidiary channels to their peripheries, the Punjab was inhabited by a large number of what can conveniently be called cattle based pastoral tribes, still called the *jaanglees* (the people of the jungle) in the local parlance. The introduction of massive canals upset this subsistence regime and led to the settlement of these tribes in stable villages and the ascension of wet agriculture as the dominant subsistence form. It is, therefore, not far fetched to conclude that in the Harappan times the people living in the *bars*, as up to recent times, were indeed pastoralists and that the area was rather sparsely populated
A second 'anomaly' in the prehistoric settlement patterns of the Punjab concerns settlements of the Early Harappan Phase. Sites of this period are rather frequently encountered to the north and west of Harappa; especially in the Indus/Jhelum *doab* and along the west bank of the Indus. Dani (8) located a number of sites of this phase on the Gomal plain in the vicinity of Dera Ghazi Khan. The site of Sarai Khola near Taxila is also of interest in this regard, as are less well known sites such as Musakhel, Tikrial, Leiah, Jhang and a number of other unpublished Early Harappan sites. In all, there are approximately twenty-five settlements attributable to the Early Harappan phase which have been found in Punjab and it can be expected that a much larger number will emerge as a result of intensive exploration (2).

An interesting and important fact to note about these sites is that there is absolutely no evidence for a Mature Harappan occupation on any of them. At first glance it would appear that these places were abandoned at some time very close to the earliest phases of urbanization in the Greater Indus Valley. This in itself is a significant historical situation deserving of investigation and explanation. Why should it be that so many Early Harappan settlements (village farming communities) were abandoned at that point in time when there seems to be evidence for the development of an internally differentiated, structurally specialized society in this region? What was the nature of the abandonment process? Was it depopulation, a shift to pastoral nomadism or any one of a number of other potentially interrelated phenomena?

There is, however, another possibility. Could it be that these sites, which carry clear markers of the Early Harappan Phase, were not abandoned at all, especially at a time when these markers were disappearing from other places such as Kot Diji or Kalibangan? It is possible, in other words, that the Early Harappan material assemblage persisted in the Punjab well into the latter part of the third millennium and was in this region contemporaneous with the Urban Phase of the Indus Civilization. This is a straightforward chronological problem of course, and one which could be solved as a part of further research.

The settlements along the Beas River, just east of the Ravi, are better documented than others from the Punjab surveys. Wright and associates (5) were able to conduct intensive research involving extensive mapping, systematic sampling of surface collections, and environmental reconstructions. The majority of villages and towns along the Beas during the Urban period are in the 1- to 5-hectare size range. Larger sites are more limited. They include range. Larger sites are more limited. They include hectare small town. The onset of settlement along the Beas was fairly rapid and correlates with the known period of climatic optimization across this region, suggesting it was partially motivated by

changing environmental conditions (5).The founding of settlements along the Beas extended the ecological niche for the Harappa region and represented a dispersal of settlements into a new resource zone enabling the intensification of agriculture and potential increase in the availability of plant resources for cultivation and animal grazing. The continued expansion of settlement throughout the Beas occupations is indicative of a successful adaptation of the Harpans to the new environmental conditions on the plain. While more study is needed before we can determine exactly how the Beas settlements functioned, their alignment and site size categories indicate that Harappa was the major urban regional center.

The site of Vainiwal, part of the Beas survey, is one of the few settlements whose internal settlement plan is fairly well understood (5). It consists of three mounds measuring a total of four hectares, though the settlement originally was much larger, measuring at least seven hectares in size and rising to between seven and twelve meters above the Beas Plain. Vainiwal was first settled in the Ravi and Early Harappan/Kot Diji periods and abandoned in the Post-urban/Late Harappan. Artifact styles and production technologies at Vainiwal and many other Beas settlements are similar to those at Harappa. The ceramic kilns visible on the survey are identical to the two-chambered kiln at Harappa. The use of Indus script signs on pottery fragments at Vainiwal and seal impressions on pottery at the Beas settlement of Lahoma Lal Tibba indicate that close ties and frequent interaction existed between the city and its outlying communities. At the same time, there are many artifacts and raw materials from outside of the sphere of Harappa, indicating that rural people at the Beas settlements engaged in interregional contacts conceivably independent of their connections with Harappa. The strategic locations of Beas settlements provided a natural corridor between Harappa and Mohenjo-daro. They also were situated at an east-west intersection between Cholistan and upland regions to the north and west.

Settlements along the Ghaggar-Hakra River: Indus settlements felt quite at home along the Ghaggar-Hakra river system of interwoven flood streams which drained the Siwaliks hills. This seasonal river system flowed to the south of the Sutlej and then southwards to the east of the Indus, with the Thar desert on its left bank, and probably joining the Indus to empty into the Indus delta. At some point in time, during the late Harappan period, this Indus tributary started drying up and was generally soaked up by the Cholistan desert around Fort Derawar before it could join the Indus. This situation created a large patch of naturally irrigated land on which a substantial number of Indus sites were able to arise. M.R.Mughal has surveyed these sites and described them in detail (9).

Afterthe partition of British India in 1947, Indian archaeologists conducted extensive surveys and excavations, bringing to light large numbers of sites in northwest India, more-or-less along the Ghaggar water streams. Kalibangan, Rakhigarhi, Mitathal, and Bernoulli are some of the most important sites in this region. No Indus sites were, however, discovered between Beas and Sutlej rivers although this area is an extension of the IndoGangetic Divide. Unfortunately, the division of scholarship between the modern borders of Pakistan and India has inhibited the coordination of research projects so that there currently is no clear synthesis concerning the relationship of patterns identified on the Ghaggar (in India) and its extension in Pakistan (the Hakra).

The ceramics in northwest India in this Preurban period bear strong similarities to the Kot Diji types in the Upper Indus and Cholistan. Still, there is sufficient variation in forms and surface features that archaeologists have established an additional cultural category, the Sothi-Siswal. Resemblances between the Kot Diji ceramics in Cholistan and the Sothi- Sisal materials are not surprising given the

contiguous nature of the two regions. Interestingly, there are occasional pottery links to northern Baluchistan, as was the case in Cholistan and Harappa. These data complement the evidence for technologies (for example, faience) known at other contemporary settlements and non-local raw materials, such as copper, gold, steatite, marine shells, and lapis lazulithat are suggestive of interaction among Pre-urban settlements.

Changes in the courses of Hakra river system have profoundly influenced the settlement patterns in Cholistan and the Indo-Gangetic Divide and induced significant cultural changes which have now been documented archaeologically. The evidence suggests that the origin, climax and decline of the Indus Valley Civilization between the late fourth and second millennium BC were intimately linked with the environmental changes generated by the ebb and flow of this drainage system.

Archaeological survey of M.R.Mughal (10) in the Bhawalpur region showed that the riverbed of the Ghaggar-Hakra braid was already populated before the Early Harappan period and that these sites, associated with 'Hakra Ware', mark the oldest or the earliest known human habitation in Cholistan (11). Recent work by Kenoyer and Meadow (12) shows that the Hakra Ware culture was also present at the site of Harappa and this could have begun sometime during the first half of the fourth millennium BC. The same area was later populated by the Kot Diji culture of the Early Harappan period. These settlements were spread laterally along the greater part of the Hakra river in Bhawalpur with their highest concentration southwest of Derawar Fort. The sites are located mostly on stabilized sand dunes and in mud flats which represent the former flood plain.

The Mature Harappan sites in this area are truly large in numbers - 174 versus 40 Early Harappan and 50 Late- or post-Harappan. The field surveys by Mughal located 83 habitation sites (villages as well as towns), the rest being pastoral camps and industrial locations. The remains of a truly large Harappan city, Ganweriwala, situated halfway between Mohenjodaro and Harappa, have been discovered by M.R.Mughal but this site has not yet been excavated.

Archaeological data also show that a major change in the settlement pattern in Cholistan took place around 2500 BC. These changes, whatever they were, necessitated relocation of settlements on new ground. It is possible that the changes in the river course affected the subsistence base of the population and forced the residents to abandon, at least partially if not entirely, their settlement areas and agricultural land. These changes coincided with the climax of the Indus Civilization. This time period also represent a very significant increase in craftrelated activities indicated by the emergence of the areas exclusively earmarked for kilns and mass production of items that are recognized at 79 sites, constituting 45 per cent of the total number of 174 Harappan sites.

Still another change in settlements took place about 2100 BC and this too is generally attributed to a change in the amount or reliability of water flowing in the Hakra river braid. It is the time of the decline and eventual disappearance of the Harappan Civilization. Since the causes of the end of the Harappan Civilization are controversial, we cannot say for certain as to what caused this decline in the Harappan sites in Ghaggar-Hakra region. In the succeeding Cemetery H period (post-Harappan period) there were 50 sites north and north-east of the medieval Derawar Fort, 28 of them habitation sites. While in the Harappan period 9 or 10 sites (6 per cent) were camps, presumably of animal herders, in the subsequent period 13 sites (26 per cent of the total) represent camps.

The most striking aspects of the Harappan period in Cholistan, along the Ghaggar-Hakra river braids, are:

1) a general shift of sites from the northeast to the

southwest, around and beyond Derawar Fort, 2) an increase in the number (48 percent in total), size and height of settlement sites, among which at least one, Ganweriwala at more than 80 hectares in size, is essentially the same size as Mohenjo-daro, and
3) a profusion of industrial sites (45 percent of the total). However, sites combining both residential and industrial functions also occur.

Mughal has also shown that in the preceding Early Harappan period industrial areas were located close to, but outside the residential area. Although this feature persisted in the Harappan period, some industrial areas at this time were demarcated exclusively for craft activities such as the firing of pottery, bricks, small terracotta objects, the glazing of faience objects and the melting, if not smelting, of copper. The emergence of separate Harappan industrial sites, or production centers, and the increased number of kilns during this period are indicative of marked social stratification, intensification of specialized activities and existence of intersettlement trade or exchange.

This largest and densest cluster of known Harappan sites along the Ghaggar-Hakra river braid has been taken as synonymous with the population distribution during the Indus Civilization. Much is being made these days of the “400-plus” Harappan (early, mature and late) sites found in the Cholistan and “over 500” in Haryana, more or less in the Ghaggar-Hakra flood plains, to provide a statistical basis for the renaming of the Indus Civilization after the imagined Sarasvati River of yore. The Indian government has been encouraging, even promoting, this renaming. For example, it has officially accepted the designation of the collections of the Indus artifacts in different museums as “IndusSarasvati” or “Sarasvati-Sindhu” collections. Notwithstanding the missionary zeal of the government and the political and religious agenda of its promoters, the name change cannot be justified on academic grounds because the premises on which the whole notion is built are quite shaky. For instance, in Haryana, containing the Sarasvati river proper, J.P. Joshi, Madhu Bala and Jassu Ram were able to list only 44 mature Harappan sites as against 297 “Late Harappan” (in fact, post-Harappan) which have no relevance to the Indus culture. Many of these 44 mature Harappan sites are marked on the strength of some stray sherds of “Harappan” pottery, indicating simply some contacts with the Harappans. Furthermore, most of these sites are minuscule - less than one hectare.

As pointed out in the above, the large number of the Harappan sites which survived in this region, may not necessarily indicate an exceptionally high density of population as compared with that of Sindh. Because the Ghaggar-Hakra system became practically defunct some time in the second millennium BC, the deserted mounds along its lowest stretch were not subjected to repeated river floods or erosion. Ancient mounds have a much higher chance of survival along a defunct river than along the banks of active and periodically flooding rivers.

Also, as discussed earlier, many sites near the Indus may have been washed away when the river flooded or changed its course. Sites like Desalpur in Kutch, for instance, have been sliced through by small rivers which have slightly changed course after the Harappan period. A thick layer of alluvium deposited by the Indus and its tributaries must have hidden from sight innumerable sites, and the rapid economic development in Punjab and Sindh must have taken its toll. Around Harappa on the Ravi there are not even a dozen sites, though it can hardly be imagined that such a large town existed without a number of villages and hamlets surrounding it. This is argument enough that the absence of sites is, conversely, no index of lowsettlement density. There can be many good reasons why in particular areas small settlements tend to disappear while in others like the desert zones, they tend to be preserved.

The reason for the drying up of the GhaggarHakra is an important issue by itself. Since Ghaggar-Hakra river is increasingly being identified with the Vedic Sarasvati River and since the banks of this "river system" is held up as the Vedic homeland of the Aryans, the Ghaggar-Hakra river braid has acquired a life of its own. The subject not only touches upon the ebb and flow of the Indus Age but also has a strong bearing on the post-Indus culture and the development of "Aryan" states in the upper part of its flood plains. Although most of the hoopla surrounding this drainage system (now consistently called "the Sarasvati River" by most of the Indian and some of the foreign archaeologists) is religious or nationalistic in character, the area is archaeologically important nonetheless. The impact of this extinct river on human settlement can be imagined. We shall take up this subject again in Volume IV (*Harappan Civilization - Theoretical and the Abstract*).

SettlementsinSindh: The lower Indus plains, comprising the region of southern Punjab and the whole of Sind, on ecological grounds and nearer to the center of the Early Indus culture, i.e. Baluchistan and Kachi plains, should have been densely settled but alluvial deposits are likely to have skewed the identification of ancient settlements toward the large and therefore more visible and durable settlements. Nevertheless, a number of smaller sites have also been located and excavated, including Allahdino, whose tiny 1.5 ha extent contrasts with its evident importance and organization. There are also a number of sites of intermediate size, including Chanhu-daro and Amri on the Indus and the more substantial Judeirjo-daro on the interface with the Kachi plain, as well as the vast settlement of Mohenjo-daro, now reckoned at more than 150 hectares.

The modern configuration of the province does not relate to the ancient pattern when the Indus was following a different course than the present one and probably joining the Ghaggar-Hakra flow at Naukot to move into the sea near the Rann of Kutch. Flam mapped the southern area of Sindh as well as the area between the Indus and the Hakra (15). What is interesting about this map is that it shows both Shikarpur and Mehar (with Mohenjodaro in between) on the left bank of the Indus, whereas these days they are located on the right bank of the river. Although 20 Harappan sites have been reported by him in the lower Indus basin, including about 13 sites between the Indus and the Hakra, it is difficult to be certain about the nature of distribution of these sites east of the Indus. West of the modern Indus, the sites, with the exception of a few like Mohenjo-daro, fall mostly in the Kirthar foothill zone and Kohistan where their locations can be understood in relation to the landscape. Furthermore, Flam, on the basis of historical data, aerial photos, and ground surveys, hypothesized that the coastline of the Indus delta was then far north to the present Indus mouth, possibly as far north as the south of modern Hyderabad. The modern peninsula of Kutch was likely to have been an island, with a possibility of even the Saurashtra peninsula being the same (15).

Apart from the delta, two other areas of Sindh are important from the point of view of the Harappan distribution: Kirthar piedmont dissected by the torrents coming down this rampart of a range separating Sindh from Baluchistan, and Sindh Kohistan which is essentially an area of open valleys with low hills and thermal springs. Agriculture in the Kirthar piedmont depends on check dams to use the water coming down the hill torrents, some of which are also spring-fed and thus perennial. Sites of this area, none a major one, have been noted by Flam (16).

Many seemingly insignificant streams in the now barren hills of western Sindh (Kohistan) and in the higher Kirthars are of value to human communities because they originate in the underground springs that abound in the fractured limestone and well up in the fissures, and are therefore perennial. These streams, like the Gaj or Kolachi, Angai and Naing, provide dependable, though limited quantities, of water and arable soil for farming. A few small Harappan sites are situated in this area. Small sites like Amiliano and Allahdino, northeast of Karachi on the Malir river, lie on a rich aquifer that supplies modern Karachi, even as the river itself is seasonal. In Sindh Kohistan agriculture is dependent on springs and the moderate amount of rainfall which the area enjoys. The area also

provides access from Sind to Baluchistan. Harappan sites of this region straddle the local routes and agriculturally suitable spots.
Where the hills of Kohistan abut the lower Indus, lies a site bearing testimony to the transition between the pre-urban and Harappan periods. This is Amri. Here, as at Kot Diji, there is an intermediate layer with earlier as well as Harappan-period pottery, but no destruction level. The inhabitants of this settlement could have taken advantage of the ecotone between two contrasting environments, i.e., the hills and the flood plain. On the other side (fifteen to twenty kilometers east) of the Indus river lies Chanhu-daro, excavated in the 1930s and found to have architecture and street drains like those of Mohenjo-daro. Diverse craft items were made here: stone weights, seals, shell bangles and ladles, and steatite and carnelian beads. Exotic stones like fuschite, rare at Harappan sites, crystal, onyx and amethyst may have been brought here from long distances.
Another area of importance is around the Lake Manchhar, to the west of the lower Indus. At the western edge of the Larkana region where the principal Indus site of Sindh, Mohenjo-daro, is located, there are a few marshy depressions, the most important of which is Lake Manchar where Majumdar noted a cluster of sites which he interpreted as fishing settlements. It is a depression that receives flood overspills from many directions: the Indus in the east, flood waters from the north, and minor rivers from the hills to the west and south. The lake expands greatly in the summer months to cover a large area and then shrinks in the dry weather, leaving some 8,000 hectares of fertile soil moistened and ready for the *rabi* sowing, according to an early twentieth-century report.
It is reasonable to infer that this micro-region was under *rabi* crops in Harappan times. There are a couple of third-millennium sites that are often submerged when the lake expands. Fishing on the lake and hunting around on its margins were probably as important as agriculture. At Naig near a hot spring, Fairservis found Harappan remains scattered along the entire slope of a hill one hundred feet high. The houses of the Harappan occupation were possessed of stone foundations, which all the later surveyors could ascertain. Somewhat better was the evidence from Ali Murad, where hasty excavations revealed a massive stone wall apparently encircling the occupation area. House walls were immediately adjacent to the main wall.
Two major survey projects have been conducted in the Lower Indus near Mohenjo-daro in recent years. They include the Sindh Archaeological Project (17) with Shah Abdul Latif University, and the Khairpur surveys (5). The Sindh survey included sites on the Lower Basin (alluvial plain) as well as others on its western margins in the piedmont and parts of the Kirthar range. The second project, under the direction of Nilofer Shaikh of Khairpur University, includes exploration in several locations to the east and north of the Sindh project and is largely unpublished (5). Later work includes various expeditions under the direction of Mallah. This wok still continues.
The principal difference between the pattern of settlement in the Lower Indus from that revealed in the Cholistan and the Beas surveys is in the site size distributions. Of the twenty-two sites identified by Flam, all are less than 5 hectares, with the exception of Mohenjo-daro. In addition, the site of Lakhueenjo-daro discovered by the Khairpur team is fifty hectares. One other site located on the top of a sand hill was spread over thirty-four hectares. Though large, occupation was brief, given the shallow depth of the deposit. Seven other sites located in the northeastern part of the region, near the Nara Nadi are situated on the top of sand hills and also have shallow deposits. Flam suggests that, like the 34-hectare site, they may have been occupied by people seeking refuge from abnormal flooding (18). Alternatively, they may have occupied a restricted ecological niche.
In contrast to the Pre-urban (discussed in the last chapter), the Urban period sees an explosion of sites and an apparent shift from a more dense settlement pattern in areas west of the plain (in the Piedmont and Kirthar areas) on to the plain itself. This movement suggests a greater dependence on floodwater farming and animal husbandry, a weakening of ties with settlements to the west, and a greater focus

on the major center at Mohenjo-daro. This is a pattern similar to that of Ganweriwala in Cholistan and indicates an increased importance of trade networks along the rivers and coastal settlements and a close network of interaction (18). The Khairpur team has identified sixty-five settlements of the urban period, an increase in numbers from the sites identified in the Pre-urban (Hakra and Kot Diji phases) periods. Four areas were surveyed. In several areas the settlements are described as densely packed workshop complexes. They include Dubi (12), Rohri (18), Veesar Valley (3), and Kandharki (2) workshops that are relatively small in size. In the Thar area, there are thirty-two urban settlements, some of which are noted on the



Countless villages and pastoral camps could be lying buried under the alluvial plains of the Indus

Rohri complex and east of the Veesar Valley. The sizes of these settlements are not yet published (5). The Dubi workshop sites are found in clusters and are identified based on diagnostic pottery and stone tools. The sites are situated on sand dunes and lie in an inhospitable zone between the alluvial

plain and the Rohri Hills. Occupation in the Dubi area at present is principally by nomadic pastoralists who gather in this area during periods of monsoon rains. Although the environmental conditions of the area have not been studied extensively, there is some indication that conditions differed in the past, since all the sites are located near small backwater lakes.

Many other small settlements in the area of study are associated with sand dunes. Gharo Bhiro, for example, a less than 1.5-hectare site, is located on the slope of a sand dune. There are large quantities of chert blades, ceramics, and clay bangles and animal figurines typical of the nearby site of Mohenjo-daro. More diverse finds included a variety of triangular-shaped cakes known throughout Indus sites as well as chert blades and shell objects typical of residential areas. A kiln was described as being "similar" to the ones identified at other Harappan sites such as the kiln excavated at Harappa and the ones in Cholistan or Chanhu-daro. These discoveries are changing the settlement picture of the lower Indus Valley. Put together, these sites, added to a large number of sites already discovered and reported, make Sindh a substantially populated area and helps to dispel the myth of the ‘Sarasvati‘ as the center of Harappan population.

It appears that the main flood discharge of the Indus spilled out on the west bank and that low lying tracts around Larkana and Dadu were filled with flood waters that remained there in the winter season. Such tracts were of key importance for agriculture, for here annual precipitation does not exceed twenty centimeters on average. Thus, Larkana was one of the richest agricultural provinces of the Indus plains and it is not surprising that the site of Mohenjo-daro lies in this district, at what is today a safe distance from the banks of the Indus. The city was accessible from the Bolan Pass, a major route linking the fertile plains of Sind with Baluchistan and southern Afghanistan and Seistan, and one that had been active for centuries before the urbanization of Mohenjo-daro.

If we go further south we come to Balakot which lies on the ancient shoreline of the Las Bela plain. In Harappan times, but not during its earlier history, there was intensive utilization of sea-shells. The Balakot settlement was constructed largely of mud brick. A few seals and chert blades, a profusion of terracotta cakes, and some metal objects are among the finds. There was contact with the neighboring Kulli culture of southern Baluchistan. To the east of the Indus, in southern Sindh, lie Garho Bhiro and Kot Kori, two small sites which testify to the importance in Harappan times of the Eastern Nara branch of the Indus, and perhaps to a land route along it from Sindh to the creeks on the northern edge of the Rann of Kutch.

On the Kachi plain, west of the Indus alluvium, is the site of Nausharo with a sequence from the later Early Harappan stage to two phases of the Mature Harappan (with eight meters of deposit in one section), and then a level with post-Harappan remains. To date, Nausharo has not yielded major evidence of craftwork. Instead, of interest are evidence of a possible water-storage tank with a baked brick spillway and a few drains. But the excavators have noted that drains do not occur in the same profusion and regularity as at Mohenjo-daro.

Stone resources, of great importance to the Harappan economy, occur in northern Sindh. A forty-kilometer-long limestone ridge extends north to south between the Indus and the Eastern Nara. Near the western edge of these limestone and chert-bearing hills, with dozens of stone-age and Harappan-period stone-flaking sites, lies the mound of Kot Diji where the remains of an earlier culture are topped by a conflagration level (broken objects, ash, charcoal), above which lie strata with Harappan artifacts. More data have now begun to emerge from upper Sindh, especially from the area of the

Sukkur-Rorhi hills where huts of Harappan workmen who quarried local flints have been found in addition to a number of sites along the present Nara canal which was once linked to the course of the Hakra. A major site here is Lakhianjo-daro.

Settlements in Bannu and the Derajaats: Gomal valley has been an important node of the settlements, going back to fifth millennium B.C. This earlier occupational sequence was topped by a Harappan occupation at Gumla, and there is at least one more reported Harappan site in this area. It is not difficult to guess that they were there both for the agricultural potential of this area at the edge of the Indus alluvium and for the Gomal route to Afghanistan for the procurement of certain raw materials. The importance of this region lies in the anomaly that the excavated sites show a strong Harappan presence there but still do not make them the Harappan sites. The Kot Dijian ceramic assemblage has a late stage in the Derajaat and Pothwar Plateau, which takes a version of this assemblage into the second half of the third millennium BC, contemporary with the Harappan Civilization This was first suggested by A. H. Dani who stressed a strong relationship between the Kot Diji culture and the Harappan Civilization. It was later confirmed by radiocarbon dating. The evidence at Gumla shows that the Late Kot Dijians of the Derajaat and Pothwar Plateau seem to represent peoples outside the Indus ideology, peoples who chose to stay with the older ways of the Early Indus and who preserved their suite of material culture. That this co-existence of the two culture was peaceful is shown by the presence of Harappan painted motifs on Late Kot Dijian ceramics: pipal leaves, fish scales, intersecting circles, and peacocks. Harappan perforated ware occurs at Gumla IV, it also produced an etched carnelian bead, a cubical stone weight, a faience button or seal, steatite (paste) disk beads, toy cart frames with wheels, triangular terra-cotta cakes, and "missiles." Earlier, this region was considered out of the extent of the Harappan realm but later discoveries by the researchers at Peshawar University have changed the earlier hypothesis and added new dimensions to the study of the Harappan Civilization in the Derajaat, Bannu region, and Pothwar.

Rehman Dheri is an Early Harappan site. Dated about 4000 BC, the site is situated 22 kilometres (13.7 miles) north of Dera Ismail Khan. Since the earliest occupation, except for the extension outside the city in the south, the entire habitation area was enclosed by a massive wall, built from dressed blocks made from clay slabs. This rectangular mound is covering about 22 hectares and standing 4.5 m above the surrounding field. The fortified town of about ten to fifteen thousand inhabitants shows sign of town planning. Pottery, and stone and metal tools were found. No seals were found and no writing was discovered, though some forms of engraving or scraping on the pottery were observed

Perpendicular to the main street are side streets and lanes, a plan present from the earliest levels of occupation. What is remarkable about Rehman Dheri is that Kot Diji style ceramics, known only in the Pre-urban period on the alluvial plain, continued to be produced in the Urban period until at least 2300 B.C. The new ceramic types associated with the Indus are absent, suggesting this region was not eclipsed by the Harappan and maintained its indigenous culture during the Urban period. Other artifacts include beads made of lapis lazuli and turquoise and human figurines that are typical of settlements in Central Asia to its northwest.

The most recent excavations in this area have been at Gandi Umar Khan, about 55 km of D.I.Khan. In contrast to the famous site of Gumla, Gandi Umar Khan showed a decidedly Harappan occupation on top of a Kot Dijian settlement. Interestingly, no transition between the Kot Dji and the Harappan cultures has been noticed. Rather, a complete break between the two periods is observed. A fifty-five centimeter thick ashy layer, devoid of any cultural material, separates the Kot Dijians and Harappans.

There are, however, some similarities: the Harappans as well as the Kot Dijians at Gandi Umar Khan were living in the mud brick structures unlike that at Harappa and Mohenjodaro, where the people were living in kiln baked brick structures. The orientation of the rooms remained unchanged from Kot Djian to Harappan. Several Harappan terracotta figurines have been found at Gandi Umar. These figurines reflect some regional variation, as they are slightly different from those found at Harappa and Mohenjodaro. The other antiquities from the site include stone blades and tools; terracotta, stone and paste beads; metal objects, like nails; baked clay ceramics; and terracotta cakes etc. Pottery and terracotta cakes are found in large number. Harappan perforated vessels are also unearthed in sufficient number. The Harappan pottery is mainly plain, however, painted ceramics were also collected, which were painted in black-on-red like the typical Harappan wares, in floral and geometric patterns. The geometric designs include intersecting circles, hatched pattern, vertical and horizontal lines and bands with thick fabric - all in the Harappan tradition.

Settlements in Baluchistan and the Adjacent Areas: The highlands of Baluchistan were occupied for millennia. Many settlements were found in this region over the course of the 20th century and quite a few of them were excavated. Their size and density reflect the opportunities available in the mountainous terrain. Dense settlement was supported by irrigated agriculture in the restricted fertile plateaus and valleys. Settlements in this mountainous region were generally small, but with a few like Dabarkot and Kulli, rising to 15-25 hectares and Nindowari at a possible 50 hectares. The seasonal rivers cutting through the region offered routes through the mountains, encouraging trade This factor was important then as now in the integrational process of the region.

During his tour of Gedrosia, the Greek name for southern Baluchistan and Makran, Stein uncovered several prehistoric sites, some of them he briefly excavated. Kargushki Damb, Kulli, Mehi, Nundara, Shahi Tump, Niai Buthi, Nindowari, and Sutgaken-dor can be specifically mentioned here. Many of these sites are located in strategic positions, on top of mountains or terrace hills, overlooking the valleys and controlling the plains and passes. Other sites are small hamlets built in the open plain. Although only a few of them have defense walls, they are of a very compact appearance. Most sites are associated with dams. The layout of some sites resemble the plan of Harappan sites: rows of houses built along lanes and streets, which are sometimes paved. Sometimes, stairs provide access to upper terraces. Building materials were large ashlars or boulders, and the houses are often preserved to a considerable height.

If one ignores the sites which only show signs of contact with the Harappan Civilization, the number of indisputably Harappan settlements in Baluchistan is not many. It is not that our knowledge of site distribution in Baluchistan is complete. One is not sure if the area has been archaeologically explored and if there are Harappan sites in the area and have not yet been been found. The major reported Harappan site in northeast Baluchistan is Dabarkot, which shows extensive Harappan deposits high up in the section of a large mound (diameter *ca.* 376 m). The site lies in the Gomal system and marks the route toward the Ghazni/Kandahar area of south Afghanistan. The Kachi plain has at least two major sites along the route to the Bolan from the Indus plain: Judeirjo-daro in the southern section of the plain and Nausharo in its northern section near Mehrgarh. These sites led no doubt to the Bolan mouth but in view of the documented evidence of agricultural prosperity of the Kachi plain including the reputation of its bullocks, it is possible that both Judeirjo-daro and Nausharo were agriculturally important settlements in their own right. The former shows a cluster of mounds - the main mound and five smaller mounds a little further away - covering in all an area of 549 m x 364 m. The rain gullies of the main mound may indicate streets.

Other sites on or near the Kachi Plain lie at the frontier of the Lower Indus alluvial plain to the east in the Kirthar and Piedmont areas surveyed by Flam (18)). Numerous sites dating to the Urban period were discovered including Ghazi Shah (18). These sites are located in a presently arid and semi-arid zone, where precipitation levels are low. Flam identified in this region important water retention devices called *gabarbands* which suggest that climatic conditions there may have differed in the past. During the Urban period, as was the case in the preceding Pre-urban, most sites were located near intermittent stream channels or spring water providing a perennial supply of water (19). The use of *gabarbands* continued during the Urban period. Though produced from stone and mud, the diversion of water through the construction of walls in this manner is a form of artificial irrigation (16). Devices of this type have not been found on the alluvial plain. In the Urban period at Ghazi Shah, assemblages include materials common to other Harappan sites. They include typical Harappan ceramic types, terracotta beads, disks, bangle fragments, and a bull figurine, as well as imported materials of lapis lazuli, agate, carnelian, marine, shell, and steatite. Also present are potter's marks or inscribed signs on several vessels.

The site of Nausharo in the Kachi plain, near Mehrgarh, has been excavated and the material culture suggests a mature Harappan settlement with areas separated by parallel streets, huge mudbrick platforms, houses with bathrooms connected by terracotta pipes with the soakage jars outside, and house foundations formed by wooden beams set in pebbles and clay. There is also evidence of possibly a large tank or canal with a spillway made of burnt bricks; more on it subsequently .

In the hills on the western side of the Kachi plain is the site of Pathani Damb at the mouth of the Mula pass on the Baluchi side. A report in the 1960s described the site as a series of ridges and hillocks covering a vast area and including a higher central mound. It was also stated that the site could rank in size and importance with Mohenjo-daro and Harappa.

In the rest of Baluchistan, Harappan sites are found principally in the Las Bela plain and the adjacent hill valleys at the border of Sindh and Baluchistan, the Makran coast, and the area to the north of the Makran coastal range, which is dominated by the Kej valley. In the Las Bela section the main site is Balakot which lies in the Khurkera alluvial plain near the Sonmiani bay. The Kanrach valley is in the hilly section adjoining the Las Bela plain on the east, with the seasonal stream of Kanrach flowing through it. The valley is framed by the Mor (1400 m) and Chapar (1500 m) ranges. Bakkar Buthi, a small Harappan site located on a terraced hill above the Kharari (a tributary rivulet of the Kanrach) and overlooking the valley, comprises a fortified southern mound and about two houses and open spaces related to chert production outside it.

Much of the pottery is identical with that found at the classical Harappan sites but there is also an element of local production. A huge stonebuilt dam blocked the Kharari before it entered the Kanrach valley and was the easternmost in a series of three dams. The site has been dated around 2400 BC. More to the southeast, the Hab valley provides access from Sindh to the interior of Baluchistan. The area seems to be dominated by 'Kulli' sites, many with well built dams nearby, but there is no specific mention of a Harappan site in this sector.

In the area to the north of the Makran coastal range the main reported Harappan site is at Miri Qalat in the Turbat oasis which lies on possibly the most important route coming from eastern Iran. Period IV, dated in the second half of the third millennium BC is the Harappan level at the site. House remains and miscellaneous objects including an ivory comb and a seal have been found. More interestingly,

the Harappan material is found in association with the 'Kulli' assemblage and numerous fish bones of possibly marine origin. Another Harappan site - Prahag - has been located on an old sand dune in the Pasni plain on the coast and interpreted as a fish preparation workshop.

On the whole, the Harappan sites in Baluchistan continue the settlement pattern established in the earlier periods: only in those areas which are still agriculturally viable and lie on arterial routes of the region. Added to these, one has to bear in mind the locations of lapis lazuli in the Chagai hills and copper and lead in the hills between Nal and Las Bela. What is interesting about the location of Harappan sites in Baluchistan is that they are localized in the areas, which witnessed considerable village growth in the earlier periods.

Coastal Settlements: Makran is an unattractive region, hot, arid, and with torrential rivers and little cultivable soil. The coastal area is an arid, inhospitable terrain, where fishing is the main livelihood. Land travel along the coast is difficult, and communications are easier by sea. The dissected Makran coast offers many sheltered inlets suitable for boats to anchor, some giving access to seasonal rivers that are navigable routes into the interior after the rains; at other times of the year, the dry beds of these water-courses provide paths for foot traffic. Communities must have been exploiting the resources of the Makran coast by the seventh millennium BC, when seashells were traded to the inland settlement of Mehrgarh, and a number of settlements are known there in the Early Harappan period.

Date-palmsandfishingareitsmainresources. As is the case in an arid zone, the rain falls in torrents. When rains lashed the region for thirtyeight continuous hours in March 1998, they left 1,500 people dead. The Harappans established several towns in the Makran, their existence explicable only in relation to overseas trade. Four coastal sites are known in this region - Sutkagendor on the Pakistan-Iran border, Sotkha Koh about halfway along the Makran coast above Pasni, Balakot on the eastern side of Sonmiani Bay, Allahdino in the eastern outskirts of Karachi. In 1960, a University of Pennsylvania expedition verified the presence of some Mature Harappan sites as far west as the Dasht Valley, the present border between Pakistan and Iran.

All of these sites have been studied extensively but individually without an attempt of finding any possible connection between them or detecting a common thread running through them. As a group, these sites are spread over a large area and radically differ from those in Kutch and Sautrashtra: the former group looks to the West while the latter is largely inward looking. The Harappan element is, however, strong in both of these groups: the former relating more to the early period of the Harappan Civilization, the latter group clearly a reflection of the civilization’s old age.



Computer-aided reconstruction of coastal Harappan settlement at Sokhta Koh near Pasni, Baluchistan

The modern port of Gwadar is located in the same general area. In recent centuries it was held by the rulers of Muscat and on occasion a coup would be staged in Muscat by a rebel prince sailing out with his militia from Gwadar. Even before, in the 8th century AD, the Omani people of Bnu-Kehtan and Bnu-Sama tribes, who rebelled against the khilafate of Bnu Muawia and then against that of Bnu Abbasia, took refuge by sailing to this region establishing a few settlements in Makran. These Arab settlements were abandoned at the time of Muhammad Bin Qasim's invasion of *Al-Sind*, when the Arab inhabitants reportedly fled to the Salt Range in the Pothwar region. This means that the GwadarMuscat sailing was relatively easy and short for premodern vessels. According to one informant, the run can be made in eighteen hours by modern motorboat or thirty to forty hours in a sailing vessel. When it was found that Harappan artifacts occur near Muscat and further bearing Oman peninsula, even further significance Harappan Civilization.

In the Las Bela section the main site is Balakot (21) which lies in the Khurkera alluvial plain near the Sonmiani bay. The Harappan level of this site (*ca*. 3 ha) has a higher western mound and a lower eastern one and shows some evidence of lanes and mud-brick houses. The use of burnt bricks has been observed only in some drains. The floor of a room has been found plastered with burnt square tiles bearing impressed intersecting circle designs. A lime-plastered courtyard contains in its center a circular depression with the remains of a wooden column. Wood was used for the threshold of the houses and there is a room (presumably a bathroom) which has yielded a pottery tub with its floor decorated by intersecting circles, a hearth, a buried storage jar, and a drain formed by a broken pot. One ordinary room has been found to measure 2.2 m x 3.2 m. A large Harappan kiln and a few smaller ones were possibly intended for the baking of animal figurines. There is no evidence of an enclosing wall around the settlement. Balakot was briefly abandoned and then reoccupied. In its new levels, it contains typical Harappan pottery. Another Harappan settlement was identified at Khairia Kot

on the western side of the Las Bela plain.It also have typical Indus materials.

Allahdino on the Malir River, probably near the coast in Harappan times, was not a port, but may have been a commercial center where goods were stored for distribution or forwarding. The site has been excavated and described by Fairservis (20). We shall come to it later.

Wedged between Balakot and Sutkagen-dor and Sotka-koh are settlements referred to as the Kulli culture. The material culture at Kulli sites is sufficiently different from the Indus assemblages that they may represent an entirely separate culture. These small and large settlements are distributed over a broad area in the region of Las Bela and positioned in strategic locations, on mountain, tops, overlooking valleys, and controlling plains and passes (22) .

Mehi and Kulli, along with several other sites in southern Baluchistan represent a special Harappan culture which has been aptly called the hilly manifestation of the Harappan Civilization. These sites were identified by Stein and later explored by Dale.The distribution of the Kulli sites makes it the largest cultural horizon in the mountains, but very little is known about the nature and development of this westerly shade of the Harappan Civilization. Kulli pottery includes many vessel forms identical to those of the Harappan Civilization: dishes on stands, "graters," some jars, and large storage vessels. There is also a great deal of purely Mature Harappan plain red ware on Kulli sites. However, inland in the copperSutkagen-dor took on for the history of the the Kulli painting style, especially with the wideeyed animals and fish motifs, is distinctive.

Harappan Sites in the Peripheries: Outside the core area, a large number of Harappan sites have been discovered along the Indo-Pak borders in India as a result of a feverish research there during the post-Independence years; a few of them have been excavated. In the northeast of the Indus Valley, Kalibangan has been the most important site, extensively excavated under the supervision of B.B.Lal. Several other sites have been reported or excavated in the same general area and at some of these sites excavations have reportedly shown the presence of Mature Harappan and Late Harappan settlements. Sites also occur on or near the eastern coast, amidst and beyond the marshes of Kutch. The most impressive of these sites is Lothal which is situated on the gulf of Cambay. The Harappan settlements, however, did not cross into the mainland Gujarat. Kutch and Saurashtra is presently beyond the pale of the Indus Valley but during the Harappan times it formed an expansive delta and therefore was probably a contiguous part of the Indus Valley.

To the west, a few sites are known on the Makran coast, the farthest being Sutkagen-dor near the modern frontier of Pakistan with Iran. These could be ports or trading posts situated in an otherwise separate culture region, or they could be the remains of truly Harappan settlements situated within a larger sphere of the larger Indus Civilization. Some early researchers considered these settlements as merely the trading outposts in an otherwise alien culture but most of the recent scholars do not make such a distinction. It is significant to note that the Indus Civilization did not crossed over into modern Iran.

While the boundaries of the Indus Civilization are more or less well-defined in the east and the west, to the northwest they are truly confusing or very much ill-defined. On one hand we see the Indus sites as far northwest as Shortugai across the Hindukush mountains, on the other we are at loss to find any Harappan sites west of the Derajaats and Pothwar or anywhere between Quetta in Pakistan and Mizar-e-Shareef in northern Afghanistan. There is not a trace of Indus sites in the Salt range in northwestern Punjab or in the trans-Indus hills of the Pashtun country, where the Kot-Diji culture of the Early Indus

period continued to flourish (see the last chapter).

Settlements in the Indo-Gangetic Divide: The Indo-Gangetic divide is the transition zone between the Indus and Ganges river systems and thus lies to the east of the Sutlej. Its boundaries lie between the Sutlej and the Yamuna and between the Himalayan foothills of Indian Punjab and the course of the Ghaggar (Hakra in Pakistan) in Rajasthan. This is a fairly large area, comprising parts of the Indian states of Punjab, Haryana and northern Rajasthan. One of the most interesting issues in the archaeology of the Harappan Civilization is concerned with the many sites of this cultural tradition which have been found in this area. Some of these sites have been known for many years but recent work has led to the discovery of "hundreds" more.

Several things are apparent. First, the initial penetration of the region between the Sutlej and the Jamuna by food-producing village farming communities was no doubt connected to the Indus cultural tradition, and there does not seem to be any indigenous culture having its subsistence base in agriculture or following a lifestyle which can be termed as sedentary. Second, the highest concentration of these food producing settlements were decidedly on the westerly area of the region, generally following the boundary between Pakistan and modern India. Even here, food production does not seem to be a norm; the inhabitants generally subsisted on pastoralism, hunting and food gathering. Third, the first food producers arrived here prior to the emergence of the Harappan Civilization. This means that some of the borderlying area was being colonized, or otherwise influenced, by the Indus people during the Early Harappan period. Fourth, the spread of the Harappan tradition was confined largely to the area where the Early Harappan people had already penetrated. Fifth, the number of 'Harappan' settlements in this area increased manifold after the demise of the Harappan Civilization in the core region. Sixth, the Indus people did not settle beyond the Indo-Gangetic divide till the arrival of Iron Age and a helping hand from *Agni*, the fire god of the Aryans. In all appearances, the Indus people considered the Gangetic plains as *terra non-incognita.* Interestingly, these boundaries continued to be in place till late historical times.

There are a large number of "Harappan" settlements to the east on the continuation of the Ghaggar Plain in northwest India. According to Possehl (13), these settlements number 218, demonstrating a large population density in excess of Cholistan. Kalibangan, Rakhigharhi, and Banawali are located here. Rakhigharhi is reported to be over 100 hectares in size but no archaeological reports are available to verify this claim. It has not yet been excavated to any great extent. Kalibangan was laid out in the classic model with a raised area in its western sector and a wall and towers restricting entrance. Its lower town, oriented to a north-south axis, was residential. Banawali was enclosed by mudbrick walls and an interior divided into two areas by a wall (14).

We would not dwell here to discuss as to how many Indus sites have been located in this region, and out of these how many are the Early Harappan, how many Harappan, and how many the Late- or post-Harappan. The available data, although enormous, is anecdotal, unreliable and utterly confusing. In all appearance, most of these sites are Late- or post-Harappan, the regional variations of the Early Harappan Kot Diji encampments, or simply belong to largely non-Indus cultures with some stray Harappan artifacts. For example, some Indian archaeologists would list such names as Kotla Nihang Khan, and Dher Majra, as the 'Harappan" sites but in fact they are of Bara culture which is quite different from the Harappan Civilization. The Indus influence is rather late. Nevertheless a few well-known, although poorly published, sites need to be paid attention to: Kalibangan and Bananwali, for instance. All of these sites are to the west of the Indo-Gangetic divide and thus lie within the Indus

basin.

We find a few Harappan sites near two navigation heads, Manda at the Chenab, and Ropar at the Sutlej. This points to the importance of river transportation in the Indus Civilization and in turn suggests that upland resources, especially wood, were procured by the urban centers from these upland peripheries. Not far upstream from Ropar on the upper Sutlej stands valuable Shivalik forest, with *chir* pine, sal, ebony, *shisham* and, at higher altitudes, *deodar*. It is most likely that the Indus people traded this wood within their realm and probably exported it to Mesopotamia as well.

The study of the Mature and Early Harappan sites in the Divide is a worthwhile endeavor in gaining an insight of the Harappan Civilization but it should be done in context with a core-peripheries paradigm as these sites simply represent the expansion of the Harappan Civilization toward the east. It must also be kept in mind that most of these sites are on the western flank of the Divide and that this area is clearly an integral part of the Indus basis rather than that of the Ganga-Jamuna plains. Most importantly, most of these settlements are Late- or even post-Harappan, a fact that most of the archaeologists somehow fail to mention.

Settlement in Kutch and Saurashtra: Outside Pakistan, Kutch and Saurastra (Kathiawar) have one of the densest concentrations of Indus settlements anywhere. This area is well-connected with southern Sind by some ever-changing and rather difficult pastoral routes through the desert, salt fields, and swampy stretches of flat land. It appears that the Indus people had expanded into this area and colonized some of it as early as in the Tagau phase in the fifth millennium BC. During Amri-Nal phase of the Early Indus period this penetration becomes quite evident. Consequently, we have here quite a few Early Harappan sites, mostly in the Kutch area along the borders. We also notice quite a few Mature Harappan sites, most in Kutch but a few in the coastal area of Saurashtra. The largest number of sites are, however, of Late Harappan or post-Harappan periods. In fact, some Indus settlements continued to exist in this region long after the Indus Civilization had decayed, declined and demised in the core area of Sindh, Baluchistan, and Punjab.

When we speak of the ‘colonization’ of Kutch and Saurastra by the Harappan people, we definitely do not mean it in classical sense. It would be erroneous to assume that when the Indus people arrived in Kutch and Saurashtra they found these areas already populated and by subjugating these populations they founded what is often referred to as the ‘Harappan Empire’. The small number of Harappan sites in Kutch and Saurashtra and their nearness to one or another route of communication, does not indicate any extension of the Harappan ‘state’. These areas were either very sparsely populated, if the evidence of Micaceous Red Ware is anything to go by, or they were not populated at all.

There is no unequivocal evidence to indicate that the Indus people lived side by side with the non-Indus peoples who had settled in Kutch or Saurashtra prior to the Harappans’ arrival. Settled life and village agriculture was introduced here in the fourth millennium BC at the earliest; before that, and even a long time after, Suarashtra and the rest of Gujarat was inhabited by hunter-gatherers and nomadic pastoralists. Whether agriculture and settled life was introduced to this area by the Harppans or the indigenous foragers acquired it through some kind of diffusional process is a moot question.

Line the Divide, Gujarat as a whole, is an important area in context with the expansion of the Harappan Civilization to the east. It deserves, therefore, an in depth treatment and we devote a separate chapter to these settlements in this volume.

Settlements in the Western Borderlands: Let us complete the survey of the Harappan settlement with attention to some sites lying at a distance from the Indus plains in the Western borderlands. By this we mean the Harappan sites lying in the traditional area of cultural interaction in Central Asia and possibly in Iran. This leads us to a group of Harappan site, epitomized by Shortugai, in northeastern Afghanistan. These settlements lie on dry steppe, some twenty kilometers upstream of the confluence of the Kokcha with the Oxus. This cluster of settlements is generally not considered an integral part of the Harappan core settlement but rather a civilizational outpost for securing trade routes or exploiting some essential mineral resources, such as tin and lapis lazuli.

The overall rarity of Harappan materials all through the highlands and plains of eastern Iran and the vast spans Central Asia might support the concept of a cultural system locked within the Indus region and largely specific to it. If considered by itself, even Shortugai could fit into this narrow scheme, explained as an episodic intrusion from the south to control resources and trade routes, not unlike several attempts to penetrate Central Asia carried out by the rulers of Afghanistan and Punjab in historic times.

With an imperial Roman frontier in mind, scholars could represent Shortugai as a northern or inland outpost. This picture may as well be true, especially when considered in light of the Indus peoples not venturing far from their 'homeland', i.e. the Greater Indus Valley, the Indus delta, and the hills and mountains feeding the Indus and its tributaries. On the other hand, the location of Shortugai settlement can also be considered as a part and parcel of the overall Indus settlement pattern. The series of imposing Harappan settlements at the foot of the Kirthars, like Pathani Damb and Nausharo, or on the Sulaiman plateau, like Dabar Kot, may be combined to form a continuous chain running all along Baluchistan's escarpment to seclude the Indus lowlands from the Arabian sea to the Central Asian steppes. This visualization is presently the only explanation of the distant outpost of Shortugai, otherwise one is compelled to discover a number of Harappan sites all over eastern Afghanistan to prove a geographic continuity of the Harappan land.

The peoples of ancient Pakistan have always had intimate relationship with those of northeastern Iran, Afghanistan and Turkmenistan. These relations were sometimes intense and sometimes just lukewarm, but they were sustained and enduring. Furthermore, these relationships were not confined to cultural diffusion, technology transfer, or trade but included the transfer of populations and ethnic mixing of various peoples. This interaction of populations and material cultures is a constant theme in the archaeology of Pakistan and the neighboring countries of Iran, Afghanistan and Turkmenistan. During the Harappan Civilization we come across, however, a time period that is characterized with a limited contact of the Indus peoples with those of Iran, Afghanistan and Turkmenistan. We do not find much of the Indus craft in that region, nor do we find the extensive use of various raw materials which can be traced back to Iran and Central Asia, the site of Shortugai notwithstanding. This indicates that the contacts with the northwest had probably declined quite a bit.

The only parallel which are similar come from the French excavations at Mundigak in southeastern Afghanistan. There a small sculptured male head which has certain stylistic similarities to the few examples of extant Harappan sculpture from Mohenjodaro. Also there is a peculiar type of ceramic object, often called a trap or bird cage but in reality a food hanger of the kind still used in the region, which is a find at Mundigak as well as at Mohenjo-daro and Chanhudaro.

Harappan settlement in the peripheries of the Indsus Valley is an important subject of enquiry for the

understanding of the Harappan Civilization. Similarly, the cultural and trade interaction of the Harappans with the people of the neighboring lands is crucial in understanding the formation and sustenance of this civilization over half a millennium. Even, the decay and disintegration of the Harappan polity in the beginning of the second millennium BC is somehow related to the developments on the borders of the Harappan Civilization. Because of this significance of the borderlands vis a vis the Harappan Civilization, we are devoting a full chapter on the subject.

Harappan Cities and Towns: Five large Harappan settlements have so far been recognized as Harappan cities: Mohenjo-daro (150 ha), Harappa (150 ha), and Ganweriwala (over 100 ha) in Pakistan; and Rakhigarhi (over 50 ha) and Dholavira (60 ha) in India. The first four are inland centers located at approximately equivalent distances in a zigzag pattern that covers the Indus river plains. The fifth, Dholavira, is situated on a small island in the Rann of Kutch, adjacent to the Indus delta. Only the first two cities have been adequately excavated, the information about the rest is rather incomplete and somewhat uncertain, sometimes even speculative. Harappan Civilization is best known through excavations at Mohenjo-daro and Harappa. Besides cities, there are some settlemnets that are generally put in the category of town, such as Chanhu-daro and Lothal.

There are two different but complementary approaches to the study of cities. One focuses exclusively on the city itself These investigations include, among other considerations, establishing the periods during which the city was occupied, determining its overall layout, and reconstructing the activities conducted there. A second approach is based on studies of cities placed in regional contexts that include settlements in the city's countryside and outlying regions. Since urbanism involves the development of supporting networks between a city and the towns and villages in its surrounding area and wider world, the development of cities is often, though not always, part of a larger overarching state system. We shall discuss the individual cities and towns in the next three chapters, here we want to make a few general remarks.

Thedevelopmentofcitiesusheredthe Greater Indus Valley in a new era and the coming together of many key features with which archaeologists identify the Indus Civilization. Although early claims of manifest homogeneity in the civilization are no longer supported by the evidence, many aspects of material culture and landscape elements are common throughout the region it encompassed. Among its defining characteristics are its system of standardized weights, distinctive seals and sealings, written script, pottery styles, and terracotta human and animal figurines. New architectural features are planned cities and extensive public works. In addition, there was an expansion of settlement umthroughout the Indus plains and neighboring regions, as discussed in the above.

Today, cities constitute an essential component of modern society as major centers of population. Cities in antiquity served the same function, but our population numbers now are much greater than in the past. In the case of Indus cities, populations of 20,000 and 50,000, though small in modern terms, were at least five times larger than villages and towns that coexisted with them. Whatever the absolute numbers of people living in them, cities were meeting grounds for a variety of social groups drawn to them as major centers of social, political, economic, and ceremonial life. In addition, they were places in which people engaged in a variety of occupations, including farming, pastoralism, craft production, and civic leadership.The crowded buildings and streets visible on the plan of Mohenjo-daro provide a glimpse into the kinds of adjustments people had to make to city life.

Harappan urban settlements, of whatever size, from 250-hectare Mohenjo-daro to l.4-hectare

Surkotada, generally shared a number of features: the use of bricks of uniform proportions but stone wherever available; efficient provision of water and sanitation; workshops and other industrial facilities; well-appointed housing; cardinally orientated streets; and the use of baked brick, particularly for bathrooms, drains, and wells. Generally, walls surended the settlement or separate parts of it, some freestanding while others provided revetment for foundation platforms; and there was usually a separately walled sector (a "citadel"), often on a raised mound, within which were located many of the settlement's public buildings. Evidence is accumulating that the urban centers also had unwalled suburbs.

These features, however, were expressed in very different ways, both from one settlement to another and from one region to region. Stone, for example, was rarely used in architecture except in Gujarat, where it was common; Mohenjo-daro and Chanhu-daro were usual in their very extensive use of baked bricks for building houses. Citadels were sometimes separate mounds, in other cases a subsection of the area within the city wall, and the structures present in this area were different in almost every settlement. Water facilities also varied markedly; for example, Mohenjo-daro had seven hundred wells, wheras Harappa, near a river, had only a few, and Dholavira had huge reservoirs. Cities and towns varied in the degree to which they were planned: in some (for example, Mohenjo-daro and Kalibangan), the north-south orientation of the main streets resulted in a grid plan; in others, there is much less apparent order; and a few did not even adhere to cardinal orientation.

It is possible that Mohenjo-daro was the principal metropolis of the Indus Civilization. Centrally located in Sindh between the Indus and Eastern Nara Rivers, with the Punjab to its northeast, the Ghaggar-Hakra to its north and east, Gujarat to its southwest, and the Kachi plain to its west, it was well placed to control communications throughout the Indus realms. It was also the largest settlement by far, its known area exceeding that of Harappa by half as much again. Among the workshops scattered throughout the city or concentrated in the suburbs, there were representatives of all types of industrial activity, and the houses yielded artifacts of every kind manufactured by the Indus people, including many inscribed seals. On its citadel was constructed a unique feature, the Great Bath, a large watertight basin set in the center of a complex of rooms and plausibly interpreted as a religious structure, related to a water-centered cult.

Harappa was also a great city, with a similar range of industries and similar signs of affluence. It lay near the edge of the Indus land in the Punjab where it could control access to the resources of the Himalayas and the Sulaimans. The other major cities that have been identified were also situated toward the edges of the Indus domains: Rakhighari in the east, Ganweriwala in the center of the Hakra Valley, and Dholavira in Gujarat. Of these Ganweriwala is known only from surface traces, and excavations at Rakhighari have been limited, but extensive investigations at Dholavira have provided valuable evidence of the development of the city through time, its size gradually increasing and its citadel becoming more complex. Where Mohenjodaro relied on a large number of wells for domestic water, Dholavira had massive reservoirs. Many other differences as well as similarities between these cities underline two principal characteristics of Indus Civilization: on the one hand a strong and uniform cultural pattern that produced the same range of artifacts, the same types of houses, the same civic arrangement of separate walled mounds, in each city and town; on the other hand, a huge diversity in the way the urban layout was effected and in other fundamental aspects of life.

An important excavation of the post-war period in India has been that at Lothal, in the southeast of the

Indus Valley, where the Indian Archaeological Survey's team under the direction of S.R. Rao revealed a great fortification platform with streets and houses of regular plan, and a series of building phases which have been dated by a number of radiocarbon samples. Equally important is the excavation at Surkotada, also in Kutch, where three stages of 'Harappan' occupation are in evidence. Dholavira, in the same general area, is still another site that has been excavated and studied. From the viewpoint of technical excellence this work does credit to the Archaeological Survey of India: we greatly regret however that the reporting has been piecemeal and incomplete, and the analysis has been rather amateurish, often laced with a Hindutva missionary zeal. Nevertheless these sites, along with Kalibangan in northern Rajasthan, seem to share with Harappa and Mohenjo-daro the layout of citadel and lower town, and it has produced architecture that closely resembles that of Mohenjo-daro and Harappa.

The Harappan cities are generally believed to be unique in their conception. The north-south alignment of long thoroughfares at such an early period is unparalleled in history. Such an idealized proposition of town planning could be based on the Early Harappan precedent as is surmised from the aerial photograph of Rehman Dheri in western Punjab. Such a concept of planned 'boulevards' and streets is also confirmed by a straight alignment of house walls along the streets, and of still greater significance are the long covered public drains built through the middle of the wide streets, with manholes in between for the ultimate removal of rubbish. Such drains were properly connected with private drains and water chutes coming from private houses which had a highly developed system of brick-on-edge flooring in the bathrooms. It appears that the long thoroughfares appear to have been dictated by wind direction. The street patterning was designed to catch the fresh breeze by those who were familiar with the local climate and environment and, probably for the same purpose, the house ventilations were opened on the side of the main streets. This arrangement and the high sense of sanitation and strict observance of the rules of regularity suggest a community of people who were certainly disciplinary and punctilious in their behavior patterns at least during the mature phase of the Harappan Civilization. We shall revert to this subject again in three subsequent chapters.

Although the evidence is limited, it is likely that cities were the administrative, religious, economic, and social centers of their respective domains and that a significant proportion of their residents were engaged in nonsubsistence activities. The central location of Mohenjo-daro, its size, and its unique features, particularly the Great Bath, suggest that this city may have been the capital of the Harappan polity, but this is by no means proven and Harappa may have enjoyed equal importance. Both cities had some unique types of inscribed materials, which are likely to have had administrative significance, and they shared other types not found in any other site (35).

Suburbs: The evidence for suburban settlement is growing, and it seems likely that this was a feature of many Harappan towns and cities. Extramural architecture has been uncovered at Mohenjo-daro, Harappa, Balakot, and Kalibangan; mounds and scatters of Harappan material, including bricks, suggest that suburbs may also have existed around other settlements, including Lothal. It is likely that suburbs often developed gradually as the area inside the walls became too small to accommodate all who wished to live in the town or city. In some cases, areas of suburban development were later brought into the walled settlement by constructing additional walls: for example, mound ET at Harappa, and the successive additions of the Middle Town and the Lower Town to the walled area at Dholavira. In other cases, including Sutkagen-dor, the suburban area was not walled; it probably housed those connected to but excluded from residence in the walled area. The suburbs are also likely to have been the locus for heavy industry and craft activities with noxious by-products, such as brick

making. They may also have included gardens, fields, orchards, or grazing, as has been the case in the suburbs of many cultures.

Towns: In addition to the five large cities, many towns of lesser areas shared features of the urban layout such as the division into separate walled mounds or areas, the efficient drainage system, and the well-built houses. Often these towns had substantial industrial areas, producing a range of artifacts, and they were well supplied with the high-caliber standardized craft products characteristic of the Indus civilization. These included fine pottery, tools of high-quality flint, a range of generally simple metal artifacts, many charming terra-cotta figurines of humans and animals, inscribed seals, and a great variety of personal ornaments made of shell gemstones, metals, and several manufactured materials including faience. In addition there must have been many fine products in materials that have perished but of which a few tantalizing traces survive, such as wood and textiles.

These towns were laid out like the cities with separate public and residential areas and cardinally oriented streets. They were generally very small, around 4 to 16 hectares. While some towns had many functions - residential, industrial, religious, and administrative - and served their local area, others seem to have had a more focused role, related to regional trade. These were entry or transit points for goods and materials, located in key places with respect to resources and communications. Those at the interface with the outside world, in the Makran, in Gujarat, and perhaps on the margins of Baluchistan, had strong walls. Some also processed local raw materials on an industrial scale. Large-scale storage facilities are known from some of these settlements, such as Lothal. Generally there was also an attached, unwalled suburban residential area, presumably housing workers and service personnel, while those responsible for running the establishment occupied housing on the citadel or in the walled town. The main role of these settlements would have been to acquire and, if relevant, process raw materials and finished goods from neighboring areas and to organize their distribution to other parts of the Indus realms or their dispatch as trade goods. Examples of this type of town include Lothal, Shortugai, Sutkagen-dor, Sokta Koh, Pathani Damb, Chanhu-daro, Kalibangan, Bananwali, Balakot, Allahdino, Surkotada, Kuntasi, Goaa Dhoro, and industrial sites like Nausharo. Some of these will be described in the forthcoming chapters.

Rural Support Structure: Unfortunately, little attention has hitherto been paid to the village communities which may be expected to have formed the basis of the Harappan economic system, as indeed they always have in Pakistan and elsewhere in the region. Similarly, far too little is as yet known about the nomadic or semi-nomadic communities who must have then as now lived on the periphery of the plains, breeding cattle and other livestock, and no doubt providing transport for trade and communication. At the present moment we have no idea how much of the population was centered upon the cities, and how much was dispersed through the villages. The fact that only the cities have been excavated and documented, it is clear that the study of Indus cities and towns of this time period have been emphasized at the expense of the villages — which is in effect what our evidence tends to do. It is only recently that attention has started to be paid to this important aspect of the Harappan civilization and a coherent pattern of the village life and its interaction with the city centers would most likely develop with time. In the meantime, we have to be content with the descriptive nature of these villages as they are becoming known to us.

We do not as yet fully understand the settlement pattern of agricultural villages around the cities or the relation which an Indus city maintained with these village settlements. In fact, no deterministic criterion, excepting perhaps size, exists to classify Indus sites into ‘cities’ and ‘villages’. It is widely

known that the various items of cultural equipment of the civilization like pottery, chert weights and blades, copper-bronze objects, beads, terracotta cakes, toy cart-frames, bangles and animal figurines, faience objects, and above all the seals, are marked by an almost compelling standardization which makes it difficult to differentiate objects of the so-called ‘city’ site from those of the village site. The difference is more in the scale or quantity than in quality. The only other apparent distinguishing feature of the city may perhaps be the planned layout and the concept of the citadel, including fortifications. Even here, from what we know about Harappan village sites, there is characteristically an ‘acropolis’ as well as a habitation area, if only a very much smaller scale than in the urban sites. The ‘acropolis’ in the village would seem to be simply a public building set above the habitation areas. This structure, too small to be habited, must have been used to perpetuate something shared across the Harappan world. It is difficult to conceive of this as having been anything else but a religion or an ‘ideological’ symbol.

Despite the above considerations, one thing that archaeologically stands out in the general characterization of the Harappan settlements is that somehow larger settlements do not have a support structure of smaller villages around them and there is a dearth of village-level settlements. Harappa and Mohenjo-daro testify to this feature. The unexcavated site of Ganweriwala in Cholistan, a large Harappan city, however, defy this description as it is surrounded by a thicket of rural settlements. Furthermore, as outlined above, even the smaller Harappan settlements appear to have an urban character.

The marked absence of the village remains in the core area of the Harappan realm points to two alternative conclusions. First, these remains must have been obliterated by the vagaries of the elements, washed away by floods, or simply buried under the alluvium. Second is the possibility that permanent villages may not exist to start with. It could be that the external vagrancy of the rivers in the Indus and the Ghaggar-Hakra plains did not allow traditional villages to grow, in the way they did in Baluchistan or on the slopes of its hills. Agriculture was probably based on the cover and meander flood plains, which were changing most of the time and therefore required the spread of urban management and resources, like the present day capitalist farming , to cope with the situation.

A third explanation could be offered on the basis of subsistence alone. In protohistoric times there would have been few people in proportion to the land available, and also that protohistoric subsistence never relied solely on agriculture: it also involved the gathering of wild plants as food, fishing, pastoral production, and hunting. Thus, we can conclude that people were not irrevocably bound to particular villages. Repeated failures of rain could have impelled sedentary communities to splinter and move afar in search of hospitable environs and thereby 'disappear' from the archaeological record.

A fourth explanation is somewhat radical. It proposes that the city folks did not depend on villages for food, they produced their own food in the surrounding land. They kept their own domesticated animals and this essentially constituted their wealth. Such an explanation seems logical for smaller cities but defies logic in the case of large cities like Mohenjo-daro, Harappa and Ganweriwala. If the Harshen cities were in fact self-sufficient in food, they differ quite radically from those of Mesopotamia, where a settlement hierarchy is so vividly visible. This also opens up a new chapter in the research of socio-economic structure the Harappan Civilization.

The Question of the Center and the periphery: In the above our primary interest, as well as the

focus of our discussion, was the geographical extent of its culture sphere in the 'core area' of the Indus Valley, leaving the peripheral settlements for only a cursory look. Question arises: what is the 'core area' or the 'center' of this civilization and what are its peripheries. This topic has lately acquired some inordinate importance because of the loose definition of the 'Harappan' or the 'Indus' which some Indian archaeologists are prone to employ.

To begin to deal with the topic at hand, a consideration of what actually defines the unique character of the Harappan phenomenon would be in order. If listed simply, this would include:

• Essentially polar-aligned pre-planned urban settlements, the few large sites usually divided into a lower town and an incorrectly labeled 'citadel.'
• Frequent architectural use of mud brick platforms.
• Fastidious, almost fanatical, attention to water control, including a plethora of hydraulic features such as drains, wells, sump pits, baths, and bathrooms.
• Unique and undeciphered written script.
• Consistent binary system of weights and measures.
• Application of this binary measuring system in architectural features such as brick size.

Despite agreement on the diagnostic traits of the Harappan Civilization, many archaeologists, especially those from India, seem bent on labeling sites as

'Harappan' which often exhibit not one of these basic traits. The sites so named are more likely Non-Harappan or, at best, Late-Harappan.

• Distinctive animal and human figurine assemblage.
• Pottery unique in terms of manufacturing technique, decoration, shape, and style.
• Virtually a complete lack of any militaryrelated materials, both in terms of weapons and, probably, fortifications.
• No palaces, forts, or other types of power center architectural constructions.

For investigation of the peripheries it is necessary that we identify the power center or centers of the civilization in question. Without known centers, one cannot begin to define or investigate the peripheries, types of relationships and systems of interaction which existed between the center and peripheries. It appears that the Harappan Civilization, at its height, encompassed a triangular area with approximately one thousand miles on each of these three sides, the corners of this triangle being Mohenjo-dar, Harappa, and Ganweriwala. This would easily make it the largest of the world's great early civilizations. While Ganweriwals has not yet been excavated, a considerable body of circumstantial evidence identifies Mohenjo-daro and Harappa as dominant cities or powers in the Indus region. Factors such as their size, strategic locations, similarities to one another, and the appearance of the greatest diversity of materials in the archaeological record at these two sites are cited as evidence for this interpretation. Acknowledging the role of Mohenjo-daro and Harappa as regional power centers seems fairly harmless, but the case for defining them as the social, economic, and political centers of this far flung civilization is not yet demonstrable.

Questions regarding the rationale for the expansion of peripheries, as well as for long-range trade and interaction, are of course in order in an investigation of this nature. A primary, if not the primary, driving force would be a need for 'luxury goods,' raw materials, and other items not found in the riverine alluvial plain which made up the vast majority of the Indus Civilization. This is essentially identical to the cases of Egypt and Mesopotamia, wherein the predominant resource was mud. Where

mud would not suffice, it was up to the initiative of the riverine peoples to look elsewhere for more optimal and/or desirable resources. In the Indus Valley, sought-after materials included copper, gold, silver, tin, jasper and agate cherts, carnelian, azurite, lapis, fine shell, steatite, antimony, and ivory. Forays would have been made towards and beyond the civilization’s peripheral areas to obtain these goods. At the minimum, then, we have an economic motive for interregional travel. Making the case for other rationales for travel or exploration beyond the central cultural sphere is more difficult, but equally worth consideration. We shall consider this aspect of the Harappan Civilization in the next volume (*Harappan Civilization - Theoretical and the Abstract*).

To facilitate the obtainment of the sought after goods, Harappan sites were located in such far flung locations as Sutkagan-dor in Makran as a source for ocean materials such as shell and for the site's proximity to Persian Gulf trade routes; Bala Kot in eastern Makran, which, like Sutkagan-dor, was a source for ocean materials and access to Persian Gulf trade routes; Lothal in Gujarat, India; Shortugai in Badakhshan, Afghanistan, for its proximity to the lapis mines. This last site, Shortugai, probably offers the best possible local application of center and periphery models. Its location far from the central Indus Valley can best, if not only, be explained in economic terms. The archaeological record, even without the benefit of written records, indicates that the Harappans set up and maintained a significant presence here designed nearly exclusively for the control and exploitation of the nearby lapis mines. Without this economic motivation, one can safely wonder if the Harappans would have had any reason whatsoever to have had a presence in the area. Material evidence in the archaeological record indicates that through or beyond Shortugai and the other apparently peripheral sites, material and cultural exchange took place between the Indus Valley proper and such long distant locations as the Omani Peninsula, Sumer, the Iranian plateau, Afghanistan, and the northwestern region of the Indian subcontinent.

When dealing with a civilization as vast as that of the ancient Indus Valley, with no intelligible indigenous written records to use as reference, any possibility of applying center and periphery models becomes increasingly complex. No all-encompassing economic theory can be put forth for a civilization without an absolutely certain center (or centers), nor an easily definable periphery. Certainly each 'peripheral' site, and that site's relationship with the central sites, must be considered on an individual or regional basis. Beyond that, the types of intercultural relationships which may have existed were no doubt hugely varied and multi-faceted: 'Patterns of cultural contact between the Indus civilization and the neighboring countries to the west (and east, we would add) varied according to both time and space to the point that the archaeological picture as a whole will provide us with a spectrum of intermediary situations ranging between the opposite extremes of external colonialization and autonomous acculturation (37)? Or as Dales put it: 'The ultimate significance of inquiries such as this is not just to play intellectual games with bits and pieces of ancient castoffs and debris. ... What we would really like to know is the nature and extent of these relations. Just how cognizant were the citizens of each region of the peoples and cultures of the other? What degree of dependence—if any—as involved?' (36). That, indeed, is the question at hand. Hopefully time and trowel will shed more light on the ingenious and enigmatic Harappans.

Identifying Harappan sites in the Indus Valley proper is relatively simple, as is the identification of distinctively Indus objects found far afield in the west. Far more difficult is the conclusive identification of Harappan sites in the regions to the east of the Indus Valley, in the present-day India. This is true because the vast majority of the “Indus” sites in India are considered Late Harappan, rather than Early or Mature Harappan. What makes this troublesome is that there seems to be no consistency in the usage of the term 'Late Harappan.'

S.R. Rao notes that "to deserve the term 'Late Harappan' it is essential that the inhabitants of the de-urbanized phase must have retained the core of Harappan achievements such as writing, use of the

Harappan standard of weights and Harappan religious beliefs including the method of the disposal of the dead" (24). Unfortunately, almost no one seems to follow this guideline. Despite agreement on the diagnostic traits of the Harappan Civilization, many archaeologists seem bent on labeling sites as 'Harappan' (whether Early, Mature, Late, or otherwise) which often exhibit not one of these basic traits. The sites so named are more likely NonHarappan or, at best, Late-Harappan.
Further contributing to the problem of identifying a site as being 'Harappan' is the fact that "only about 3% of all the sites reported as being 'Harappan' have been excavated horizontally to the maximum of 20% of their area" (25). This problem in identifying Harappan sites becomes all the more difficult the further away the site is located from the Indus Valley proper.
Consider the work by Joshi, Bala, and Ram (26). By locating some 700 supposedly “Harappan” sites in India proper, they claim that the Indus Civilization encompassed 'an area of 1.3 million sq. km'. Compared with Mark Kenoyer's figure of 688,000 sq. km., this long-dead civilization seems to have really grown. Since the new found “Harappan” sites are on the Indian side of the border, along the Ghaggar river braids, the three archaeologists use this new assessment of the geographical extent of the Indus Civilization to suggest that “instead of persisting with the older title, the Indus Civilization, we might as well call it the 'Saraswati Civilization' or 'Saraswati Culture'" (26). So we now have a suggestion put forth not only for a dramatically larger cultural sphere, but for an entirely new center! With enough difficulty involved in defining the periphery of the civilization, this type of nationalistic relocation of the center of the Indus Valley Civilization is not only asking for trouble, it is absurd.
Settlement Network - Communication Lines: ‘Settlement network’ has not only a synchronic but also a diachronic dimension. Analogous to a normal net, the 'knots' in the settlement network are the settlements themselves and the 'strings' are communication lines which may be material (e.g. transport lines like land, water or airways, etc.) or also immaterial (e.g. acoustic, optical, electronic ones). Since without communication 'culture' does not exist, an investigation into settlements of a culture would be incomplete without also considering the settlement network (25).
The connecting road system is a key factor for understanding the settlement nets and the settlement pattern itself. The first investigations into settlement networks in archaeology were carried out by anthropologists in the USA. This method soon was adopted by other scholars and expanded. To the Indus Civilization it was at least indirectly introduced by Louis Flam in his Ph.D dissertation (17).
The question is often asked: Why the Harappan cities are not situated in the center of the Indus alluvium? The answer probably lies on the location of road network that was already established in the Earlt Harappan times. In relation to the connection with the potential land route systems of the Indus Valley, the locus of the city in the middle of the alluvial Indus Plain would have been absolutely disfavorable as Mohenjo Daro would have been cut off from land routes for more than four months per year by the inundating river. Then and as late as the early twentieth century annually the Indus transgressed its banks after mid-July and in its lower reaches inundated the land for miles to the east and west. Thus the lower alluvial Indus Valley was not usable for at least four months in the year for overland transportation.
The selected locus of Mohenjo-daro close to the Indus only is explainable through another means of transport, namely the boat. The roundthe-year availability of the Indus as a water transportation way by boat enabled permanent access, specially during the inundation period to the entire river system with its tributaries and to the entire coastal zone of the Arabian Sea. The extraordinary desire for, expansion of the Mature Harappa phase, especially in the direction of Saurashtra and along the Makran coast, are characteristic of this period. In the light of all this, the selection of the locus for the center so close to a dangerous river system is understandable. But it anticipates not only the extensive use of the boat before the existence of Mohenjo-daro but also the exploitation of the Greater Indus Basin. The boat must have already been known and used during the Early Harappan period, most

probably by the Kot Diji Culture people.
For the selection of the locus of Mohenjo-daro the crossing of two transport systems must have been responsible: the water system of the Indus itself and the west-east land route from the Quetta Valley (Mundigak and further on to Mesopotamia) along the Bolan River to Kot Diji and the western Nara. At Kot Diji, for example, the richest flint mines of the Rohri Hills were long exploited.
If this hypothesis is true, then the Indus Civilization was controlled from Mohenjo-daro primarily by means of water transport. Therefore, the 'settlement net' would not consist of hexagons or circles but of a more linear structure along the water transport routes. Therefore, simple linear connections as demonstrated by Flam or Mughal would not reflect the individual situation of the Indus Civilization. If there existed sub-centers, they would exist within the settlement-net structure marked by the peculiar interconnection of accessibility.
Once we establish a settlement net with hierarchic settlement structures for the Mature Harappan period, we should look for the potentials of interconnection and hierarchy for the Early and Late Harappan periods as well. For those nets it might become clear that they were much less dependent on the water transport and more oriented towards land transport (like the Amri system in the mountains against the Hakkra system or the Kot Doji one).
The river transport seems to have begun within the Kot Diji Complex. The extension of this material complex suggests early contact with the alluvial core area of the Indus Valley. The center could easily have been Harappa in Punjab, but the area of the Gomal Plain, with mighty settlements such as Rahman Dheri (first half of the third millennium BC), and the Manchhar Lake also come in question, with the advantage that the latter is not only the largest sweet water reservoir on the subcontinent, but also settlements are located from the end of the fourth millennium which could have existed only with the help of boats. Here the origin for the development of the boat can be sought. Such boats, as they are known even today with the Mohana, have a flat hull, and are designed to ply on shallow water.That the communication routes ran essentially north-south has been mentioned by several authors. It seems essential that apparently a parallel system existed on the coatal region which connected Sindh with Kutch and Saurashtra. The temporal relation to the Indus axis seems to be given.

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Chapter 7

Mohenjo-daro and the Lower Indus Towns



Mohenjo-daro is the most famous archaeological site of the Harappan Civilization in the southern part of the Indus Valley. There are remains of some other Harappan sites cient data. This caution is well placed but strangely enough the same criteria are not applied when they deal with the ‘Harappan’ sites in Gujarat and the Divide.

MOHENJO-DARO

in this area, and countless more probably remain hidden under the alluvium. While Mohenjo-daro epitomizes the southern Harappan cities, Nausharo is most prominent for the Harappan industry. Other notable sites, which have been excavated, are Chanhu-daro, Kot Diji, Allahdino, Balakot, and Amri; they all fall within the gambit of Mohenjo-daro style of city planning and architecture. Some of which can easily be considered towns, if not outright cities. Sutkagen-dor is the farthest outpost of the Harappan Civilization in the south, situated on the IndoIranian border. In between are countless other sites that have been surveyed but not yet excavated.

There are apparently more sites on the right bank of the Indus than on the left. Looking at the geographical location of Mohenjo-daro, Chanhu- daro, Allahdino, Amri, Kot Diji, Balakot, etc., one is compelled to believe that this area must have contained several clusters of rural settlements around these cities and towns. The Indus is an aggradative river in Sindh, the silt it spread over the land throughout the centuries must have hidden numerous sites from our eyes. The Indus has also been prone to vast and aggressive floods; these floods must have wiped out an unknown number of sites from the face of the earth. A true settlement density in Sindh cannot, therefore, be gauged from the existing settlement remains.

Apart from these remarkable urban settlements truly conforming to Harappan tradition, we have a large number of sites, collectively called the Kulli culture, in southern Baluchistan. These urban settlements were contemporary to Mohenjodaro but deviate considerably from its culture. Still, for the similarities of the Kulli artifacts with those of Mohenjo-daro, Kulli settlements are generally considered as the hilly manifestation of the Harappan tradition and largely a part of the greater Harappan tradition. There are several sizable sites in Zhob and Loralai valleys of northern Baluchistan which show an unmistakable affinity with the Harappan culture but archaeologists are

reluctant to categorize them as the Harappan sites for want of suffiOf all the Harappan sites in the Harappan realm,
Mohenjo-daro is by far the most impressive. It has
been extensively excavated and the findings ade
quately reported and analyzed. It covers an area of
some 150 acres, of which something less than one
third has been exposed. We do not know much
about the formative stage of Mohenjo-daro or its
early history. We do know, however, that through
the build up of occupation debris and the construc
tion of massive mud brick platforms, the settlement
grew to monumental proportions, with high mounds
reaching as high as 12 meters above the modern
plain level, and definitely much higher above the

ancient plain. Mohenjo-daro epitomes all Mature Mohenjodaro and Southern Cities Harappan settlements and it appears that it was
founded in the Early Harappan-Mature Harappan
Chapter 6
Transition by a group of Harappan "true believers."

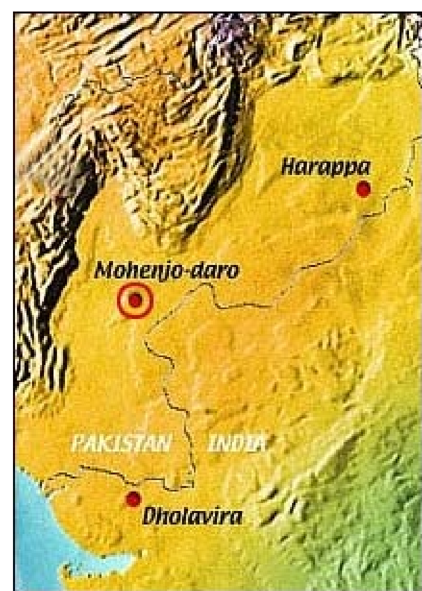
The activities occurring at Mohenjo-daro were theMohenjodaro and Southern Cities

essence of Harappan life and ideology.
been

Thesitehas described by several archaeologists: Marshall (1), Mackay (2,3), Dales (4), Possehl (5,6), Kenoyer (7), Kurshid Sheikh (8), Wheeler (9), Jansen (10,11) and others. Two lastest additions are those of McIntosh (12) and Wright (13). The

site

Internet www. H a r a p p a . c o m . i s also a good source of information on Mohenjodaro. Of



Mohenjodaro is the most famous archaeological site of the Harappan Civilization in the southern part of the Indus Valley. There are remains of some other Harappan cities in this area and countless more probably remain hidden under the alluvium. While Mohenjodaro epitomizes the southern Harappan cities, Naushahro is Harappan industry. Other notable sites, which have been excavated, are Allahdino, Balakot, and Amri; they all fall within the gambit of Mohenjodaro style of city planning and architecture. Sutkagen-dor is the farthest outpost of the Harappan Civilization in the south, situated on the Indo-Iranian border. In between are countless other sites that have been surveyed but not yet excavated.

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148

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daro had been much less disturbed than Harappa and it is the most extensively excavated Harappan site. Furthermore, its excavated buildings are still so well preserved that the ruins are awe inspiring. Some 300 houses/structures of various phases of the Harappan period and about 70 wells have been uncovered at the site. There are very few prehistoric sites in Pakistan or anywhere else in the region that have seen sustained excavation to this degree. This is the largest Bronze Age city in the world where one can walk down streets well defined by the high walls of homes and other buildings, climb the stairways used in antiquity, peer down ancient wells, and stand in bathing rooms used over 4,500-5,000 years ago. One feels a sense of being in a living

Mohenjo-daroisanextraordinary,unique place, representing the Harappan urban society in its totality. It is at Mohenjo-daro that important pieces of Harappan sculpture, such as the bronze 'Dancing Girl', stone busts portraying men (including the 'Priest King') and monumental stone representations of animals on pedestals, have been found. And it is here that the greatest variety of seal motifs depicting animals and aspects of religious thought/ life occurred. Notable also is the prolific use of faience, ivory and shell in domestic life.

Based on the density of houses in the excavated areas at Mohenjo-daro, Walter Fairservis proposed that as many as 40,000 people lived in the residential town, which he calculated as being 76

community.Mohenjodaro and Southern Citieshectares of the total site (14). The inhabited area of

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An aerial view of Mohenjodaro

An aerial view of Mohenjo-daro

Mohenjodaro[149]

Of all the Harappan sites Mohenjodaro is by far the most impressive. It has been extensively excavated and the findings adequately reported and analyzed. It covers an

Mohenjo-daro is actually greater than 76 hectares and therefore may have held considerably more people than calculated by Fairservis. On the other hand, it is unlikely that the entire city was continuously occupied to its maximum capacity, and the population probably fluctuated considerably when people from the surrounding countryside and distant villages came to the city for special festivals or during trading seasons. Assuming the permanently inhabited area as 100 hectares, the population of Mohenjo-daro at its height of prosperity could have been about 85,000 souls compared to 65,000 for Harappa.

Site Location: The site is located in the Larkana district of upper Sindh, several miles to the east of the railroad station of Dorki. It is close to the right bank of the modern Indus River channel and were it not for protective bunds, would probably have disappeared in large part in the last several decades. As it is, flooding occurs in the summer months right up to the bunds, and the local village of Hasan Wuhan to the northeast can only be reached by boat. Climatically, it is an arid region and the site is situated on a Pleistocene ridge that sits like an island in the floor plain of the Indus River. Although the ridge is now deeply buried by the annual flooding that inundated the plain, it may have been more prominent in the prehistoric times, with the city standing out above the surrounding plain. Intuitively, one assumes that the city stood on the banks of the River but factually there is no positive evidence that the site was ever located on the bank of the Indus or that the river sent any branch or canal to it.

The site falls readily into two parts: a high artificial mound (the ‘Citadel’) rising to about forty feet on the west; and a low, undulating, and much broader area on the east (the so-called Lower Town). To the north and east of this low area are scattered remains, suggesting that the site extended considerably beyond the apparent bounds of the visible. The present open space between the two mounds was open in the past too and one might have reason to suspect the presence of a canal or artificial channel. Such water systems are certainly within the bounds of probability, especially in view of the accessibility of the river and the use of boats attested for this civilization. However, until

excavations are carried out with such problems in mind, we must be tantalized by these possibilities without admitting them as facts.

Taking a broader view, Mohenjo-daro is located in a central position between the two river plains, the Indus on the west and the Hakra on the east that would have flowed to the east of the Rohri hills. Today, the Indus flows to the east of the site and the Hakra riverbed is dry. Another noteworthy feature of its location is easy access to southeastern Afghanistan (Helmand Valley) through the Bolan Pass and then through the Khojak Pass. Thus, in its heyday, Mohenjo-daro would have dominated the riverine trade networks moving from the coast to the northern Indus plain, as well as trade routes going east-west.

The Name: The name of the site is spelt *Mohenjodaro* or *Mohenjo-daro* in the official reports of its discovery in the early 1920s and in the various subsequent publications by Sir John Marshall and his followers. It had generally been agreed to mean the 'Mound of the Dead' as the word for the dead in Sindhi language is *moen*. In 1960 the spelling was rectified
adopted
to '*Moenjodaro*', which is now officially by the Government of Pakistan. The

change in the name of the site from *Mohenjo-daro* to *Moenjodaro* has caused some heated discussions and scholarly debates. The opponents of the change express doubt whether the nomenclature originally ever meant the 'Mound of the Dead'. They argue that giving this meaning to the name of the place infers a *prima facie* knowledge of the archaeological character of the mound as a place for burying the remains of a dead civilization before its actual systematic excavation. As the name existed from antiquity, it could certainly have not meant the 'Mound of the Dead', but something else.

A more plausible explanation, advanced by Sheikh Khurshid (8) and some other Pakistani archaeologists is that the name means 'the mound of the Mohan people'. Mohan is the name of a small group of fishermen living in boats and spending their whole lives on the crafts floating over the River Indus in its stretch from Sukkur to Manchar Lake. They earn their livelihood by fishing, catching waterfowl in flood seasons, and working as porters and ferrymen for the small villages of the settled rural communities along the banks of the River. The Mohan boatsmen speak the Sindhi vernacular of the rural areas but they are said to have a number of peculiar words and some cultural traits which set them apart from the rest of the rural population. A detailed ethnological study of the Mohan people is lacking but it appears that they are a remnant community or ethnic group of a native population which must have been more numerous in the past.

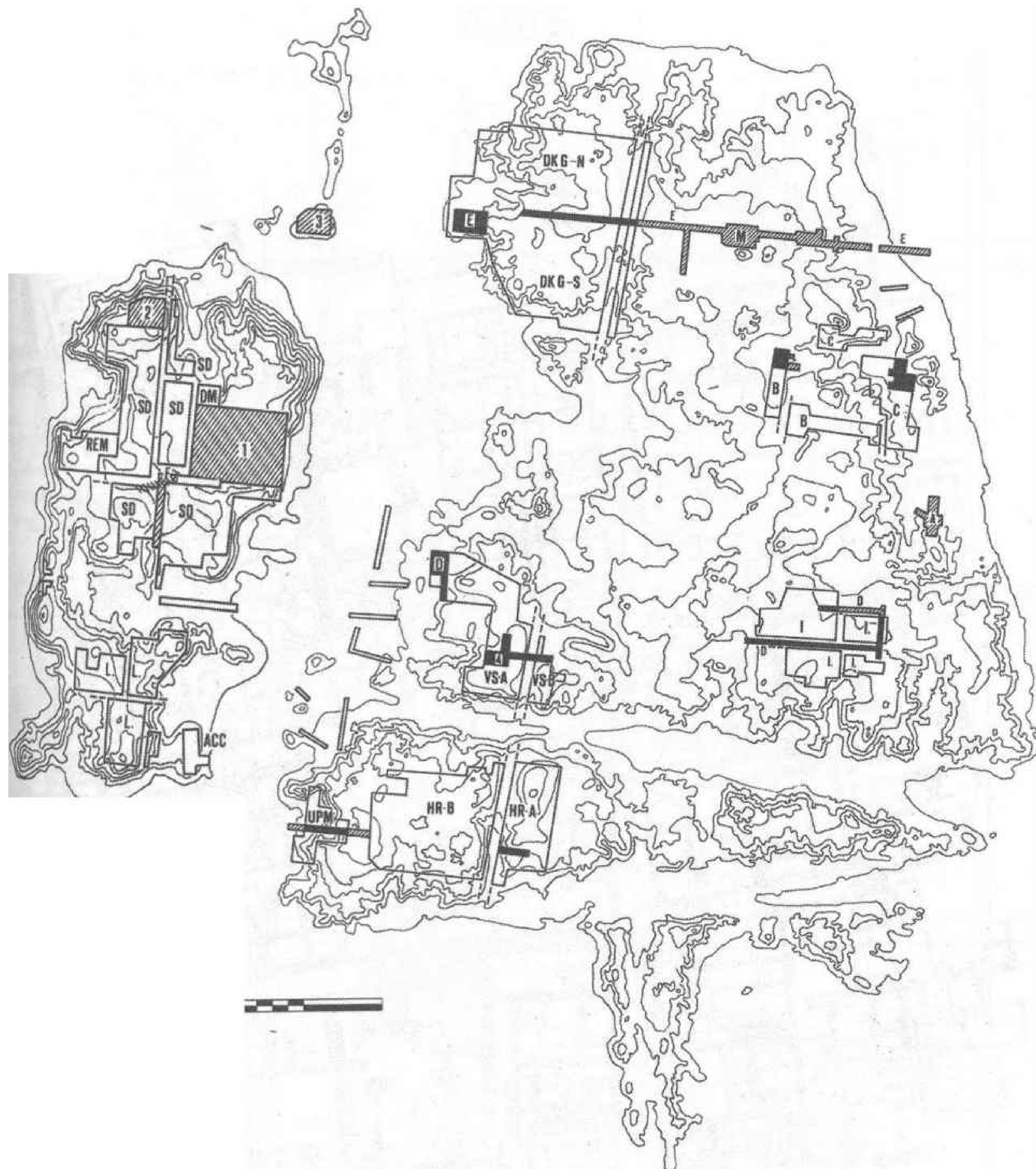
The Mohan boatmen still hold an annual festival of traditional kind at a point on the river bank right opposite the site of Mohenjo-daro. It is held some time at the beginning of the flood season and is marked by boat racing, swimming long distances along the water current. A detailed ethnological study of this amphibious community, such as their traditional designs of wood carving to decorate the interiors of their house-boats, may reveal other resemblances with the sculptural art of the classic period of the Indus Valley Civilization. Even more productive may be a philological study of the odd words and phrases current in their dialect in order to trace the nature of their original language, getting thereby some clues to the language spoken by the Harappan people.

It is quite possible that the ancestors of the present Mohans were the daring sailors who used to venture out in their flat-bottomed sail boats laden with cotton bales, sugarcane syrup, and other products of the country, and voyage across the Persian Gulf within sight of the Makran coast or

hopped through such trading outposts as Balakot, Sokhta Koh and Sutkagen-dor on to the isles of Bahrain and other landing places in Sumerian climes. Like the solid-wheeled bullock carts still plied in the countryside around Mohenjo-daro, and pointed out as a living example of the continuity of traditions reflected in the terracotta toy carts in Harappan culture, the flat-bottomed sailcrafts of the Mohan boatsmen resemble the pictures of boats seen on some seals unearthed at Mohenjo-daro.

In view of this ambiguity of the etymology of the name, it is advisable that we stick to the nomenclature used by the original investigators, more particularly John Marshall, and retain the name of the great Indus city as Mohenjodaro or Mohenjodaro.

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Figure 5.2. Mohenjo-daro site plan. Courtesy M. Jansen, Aachen Research Project Mohenjo-daro. **Mohenjo-daro site plan; the 'citadel'**

on the west and the

'lower town' on the east. (*M. Jansen*)

plan shows the dense nature of occupation at Mohenjo-daro. Areas designated with **Discovery and Excavations:** Mohenjo-daro buildings, was discovered in 1922 by R. D. Banerji, an officer

wereconstructed of baked brick and lined up along streets oriented to the cardinal points with of the Archaeological Survey of India, two years streets in a north-south direction and major

smaller lanes,
east
and
west.

after major excavations had begun at Harappa,
Other features represented on the map

some 590 km to the north. Since then, no site of the and ancient Indus Civilization has received more archaeological and scholarly attention than Mohenjodaro. Most widely known are the large-scale excavations directed from 1922 to 1927 by Sir John Marshall and from 1927 to 1931 by Earnest Mackay, the publications of which provide the basic archaeological data for the study of the site. Also, well known are the excavations conducted in 1950 on the so-called Citadel Mound by Sir Mortimer Wheeler. And finally in 1964-65 Dales conducted some excavations along the western edge of the old HR Area. One of the aims of these excavations was to obtain a complete stratified sequence of architecture and artifacts from the latest level down to the earliest. Since 1964-65 only salvage excavation, surface surveys and conservation projects have been allowed at the site.

Less well known are extensive excavations conducted from 1932 to 1934 by Q.M.Moneer and K.N.Puri. The only published reference to their excavations is a brief notice in the 1930-34 Annual Report of the Archaeological Survey of India. Largely forgotten, these excavations are known today in the records of the Department of Archaeology as the DK-B. According to Dales, who has examined these unpublished documents, if all the results of these digging were published one would undoubtedly know considerably more about the city.

In the 1980s extensive architectural documentation, combined with detailed surface surveys, surface scraping and probing was done by German and Italian survey teams led by Michael Jansen (10) and Maurizio Tosi (15), respectively. Jansen’s analytical work on the water supply and sewage system of Mohenjo-daro has contributed a lot to the understanding of the architectural feature and town planning of Mohenjo-daro (11). Jansen organized archives, discovered field notes from the Marshall and Mackay field seasons, reprinted and conserved photographs and has been responsible for many other small triumphs that taken together are a significant contribution to understanding Mohenjo-daro. Jansen also developed his own body of theory on Mohenjo-daro. First, he believes that the site was a 'founder's settlement' built at the beginning of the Mature Harappan as a kind of symbolic representation of the new civilization. This city was built on a series of platforms which elevated the settlement above the plain, protecting it from floods. He notes that the basic alignment of streets, lanes, drains and wells were laid out at the beginning and maintained through the span of the Mature Harappan. Many studies later spun off the Aachen project at Mohenjo-daro. Alexandra Ardeleanu-Tansen studied the sculpture, terracottas and excavated a well; Ute Franke~Vogt studied new glyptic material. Several studies of Mature Harappan craft production were conducted. The most extensive recent work at the site has focused on attempts at conservation of the standing structures undertaken by UNESCO in collaboration with the Department of Archaeology and Museums of Pakistan, as well

as various foreign consultants (8).

Based in large part on their own research at Mohenjo-daro, Blackman and Vidale have produced some generalizations on Indus craft production. They note that the surface survey of Mohenjo-daro shows that most of the heavy, polluting industries (e.g. ceramic and brick firing and metallurgical activities) are not represented in the urban compound. It must be presumed that these activities were carried out in a series of peripheral settlements (now invisible due to alluviation) that supplied the center.This position can certainly be sustained for brick making, but for ceramics the case seems to be somewhat different. Blackman and Vidale go on to note that non-polluting industries were located within Mohenjo Daro. These industries were involved in the manufacture of things like seals, beads and shell ornaments, luxury and other prestige items, probably for consumption within the city. The very high quality of Indus craftsmanship is also highlighted by these studies. As new work took place at Mohenjo-daro, a renewed investigation of Harappa, another of the urban centrers of the Indus Civilization, was also formulated.

During the work with the UNESCO project one of the new spurs attached to the Indus bunds was built to protect the site against flooding by the river. During the foundation works 2 m below the present-day surface (at that site approx. 44 m), extensive settlement walls came to Iight and so it can be assumed that Mohenjo-daro extends below the present surface alluvium in areas as far as 1.5 km from the center. With the help of borings around Mohenjo-daro we know that the city beneath the present-day surface extends far to the south and east, also somewhat to the north, but not to the west. With an estimated minimum of 200 ha, Mohenj-daro clearly overshadows all known settlements of the Indus Civilization. In terms of its size, this city is the center of the civilization. But Mohenjo-daro distinguishes itself not only by its size. No other settlement contains so many unique architectural structures (especially the Great Bath), so many buildings made of baked brick, and so many drains and wells (See below). In size and wealth no other settlement is comparable.Thus, it seems, Mohenjo-daro was first in the hierarchy of all the other settlements known up to now.

Many indications point towards a founding and building of the first urban 'Mohenjo-daro' in a rather short time. If this assumption is right then the builders of this monumental project would have been already fully in control of the entire spectrum of building technology (prefabrication of normed bricks, walls in block-bond [so-called English bond], leveling of the water drains and the sinking of wells down to over 20 m in depth, etc.). Moreover, they would have been able to plan and organize the construction of a city of more than 200 ha in a short time on top of a protective earthen substructure up to 7 m high in the middle of the alluvial Indus Valley plain despite the danger of annual floods. The foundation structures alone which finally protected the buildings on top of it against the annual floods could have occupied for example 5,000 workers for several years. These extraordinary efforts would have been possible only by a highly developed spirit of planning, the necessary population potential, and a corresponding economy. Above all, there must have existed the necessity for such an extraordinary effort.

Although the presence of an earlier settlement of Kot Diji type beneath Mohenjo-daro is sometimes speculated, this is by no means a proven fact. At Mohenjo-daro the deepest levels lie below the water table. But up to now all available information (soundings and borings) indicate no earlier settlement below this. This supports the hy

pothesis that the original settlers selected a spot on
alluvial ground in the direct vicinity of the Indus de
spite the danger of floods. An earlier permanent
settlement without artificial elevation by means of
platforms would not have been possible as it would
have been inundated annually. Therefore, MohenjoMohenjodaro and Southern Cities! daro would not be the place of transition from the
riverbed is dry. Another noteworthy feature of it location is easy access to southeastern

Early to the Mature Harappan period, but it would
be, shortly after, the first great building achievement

Afghanistan (Helmand Valley) through the Bolan Pass and then through the Khojak Pass. Thus, in its heyday, Mohenjodaro would have dominated the riverine trade networks moving from the coast to the northern Indus plain, as well as trade routes

Impression of an Indus seal, showing a flatbottomed boat with a cabin in the middle


A flat-bottomed boat of Mohan people on the lower Indus


A close-up of a modern flat-bottomed Sindi boat on the Indus near Sukhar

leading to the Quetta/Pishin Valley to the west.

We do not know much about the formative stage of Mohenjodaro or its early history. We do know, however, that through the build up of occupation debris and the construction of brick platforms, the settlement grew to monumental proportions, with high mounds reaching high as 12 meters above the modern plain level, and definitely much higher above plain.

The site has been described by several archaeologists: Marshall, Mackay, Dale, Possehl, Kenoyer, Kurshid, and others. The last named produced booklet on Mohenjodaro the sponsorship of the UNESCO and Kenoyer brought out a wellillustrated book on the cities, wherein figures out most

prominently. The Internet site www.Harappa.com, is also a good information on This chapter takes advantage of all these sources.

Our perception of how the Indus cities were built is necessarily derived from the excavations at Mohenjodaro

of an already fully matured civilization - the result of an extraordinary need of an already potent culture.

Using this theory as a point of departure, the question at once comes up that if existing, where was the former centre of power, the former 'central place' and why was Mohenjo-daro built exactly there, in the active alluvial Indus PlainI with such enormous efforts? The question of the need to settle in alluvial zones is traditionally answered by virtue of agricultural use of the soil. This may well be the case for Neolithic settlements, but it seems to have become much less significant for the bronze age city, not only in the Indus Valley. At least, the urban lay-out of Mohenjo-daro does not point towards an agricultural settlement. It seems much more to have been a centre of coordinative administration. If it was not primarily the fertility of the inundation which made the Indus people to settle so close to the river itself what else could have been the reason for such an extraordinary (and very expensive!) effort?

The Indus Civilization obviously did not begin with Mohenjo-daro but rather produced this city. Situated on the axis of the east-west trade route Quetta, Kachi, and Indus, as well as within reach of the open sea, Mohenjo-daro was probably a new foundation: the result of necessity and experience. Several considerations show that the peripheral areas supplied different raw materials. This was probably the situation for Harappa as well.

Excavated Remains: The excavated parts of Mohenjodaro are grouped into four main sectors, known as ‘SD.‘. ‘DK.‘. ‘VS.’ and ‘HR.’ areas - the abbreviations indicating the names of the principal excavators: Siddiqui, Dikshit, Vats and Hargreaves, respectively. Of these, the first area exposes the buried structures in the north of the smaller but higher mound, popularly called the Stupa Mound or Citadel Mound, while the other three reveal the thickly constructed parts of the larger but lower mound to the east, conveniently called the “Lower Town”. There is another small sector of excavations over the south of the Stupa Mound designated as ‘L’ area in the old published plans, which was excavated in 1936.

Citadel Mound is the highest and most prominently visible structure at the site, excavated by R. D. Banerji in 1922-23, and then by B. L. Dhama in 1925-26 under the direction of John Marshall. Excavations in the SD area of the Citadel


A section of the ‘lower town’

Mound uncovered a large colonnaded building with a specially designed water tank usually referred to as the Great Bath. Just to the southwest of the Great Bath is the so-called "Granary," a massive building with solid brick foundations with sockets for a wooden super structure and doorways. Another building in this area has been labeled as the College. The *L area* of the 'citadel' mound, originally excavated under the direction of John Marshall in 1925-26, includes a pillared hall and shell working premises.

From the Stupa Mound to the *Lower Town* is a short walk of a few hundred meters. Here, even in the limited portions laid bare by the archaeologists' spade, one is likely to get lost in the maize of lanes and by-lanes where the view is obstructed by the high standing house walls. On the first visit to these ancient ruins, it is better to be accompanied by a guide or equipped with a detailed plan of the city. It

is rather like walking through a fossilized embryo of a miniaturized Manhattan. This analogy has often tempted scholars to label its thoroughfares running from north to south as First Street and Second Street. Another analogy for the plan of the mound of the Lower Town of Mohenjodaro looks like a magnificent tamarind tree, with its trunk going southwards, and the broad leafy

canopy rising in bellowing masses towards the north. The length of the canopy from north to south measures nearly 820 meters, its width at the base 720 meters, which tapers north to nearly 330 meters. The total area covered by this roughly trapezoid canopy is 5.62 times larger than that of the Stupa Mound.

T *he Lower Town* is actually made up of numerous lower mounds that lie to the east and may represent multiple walled neighborhoods, just like those unearthed at Harappa. HR Area is located at the western edge of a massive series of mounds that extend further to the east and south. This area was first excavated by H. Hargreaves and then by M. S. Vats in 1925-26. UM Area is a small excavation area at the southwestern edge of HR Area. Excavated by G. F. Dales in 1964-65, supported by the University of Pennsylvania Museum (UM), Philadelphia, Pennsylvania; The excavation of VS Area, located directly north of HR Area, was undertaken by Hargreaves and Vats in 1925-26. DK-I area, sometimes referred to as Moneer Area and excavated by Q.M.Moneer in 1934 and later by K.N.Puri in 1936-37, lies at the eastern edge of the mounds that are associated with VS Area. DK-G Area is situated at the northwestern corner of the "Lower Town" and to the west of a major north-south street that connects VS and HR areas. It is located along the western edge of a large series of mounded ruins that extend to the east. It was originally excavated by K. N. Dikshit in 1924-25; later excavations were Mohenjodaro and Southern Cities!carried out by E. Mackay assisted by N. G. Majumdar, H. L. Srivastava, K. N. Puri, and D. D. Mathur in brick to retain the infills behind. Similar platforms were built for blocks of houses in the larger 'Lower Town'. The initial platforms were some 10 meters high, but were further raised or extended from time to time: these platforms enabled houses in the city to be built above the flood level. Spaces for roads were marked well before houses were built, so that Mohenjo-daro had long broad roads running parallel with other roads, with lanes meeting them at right angles. While a main street in the acropolis was 6

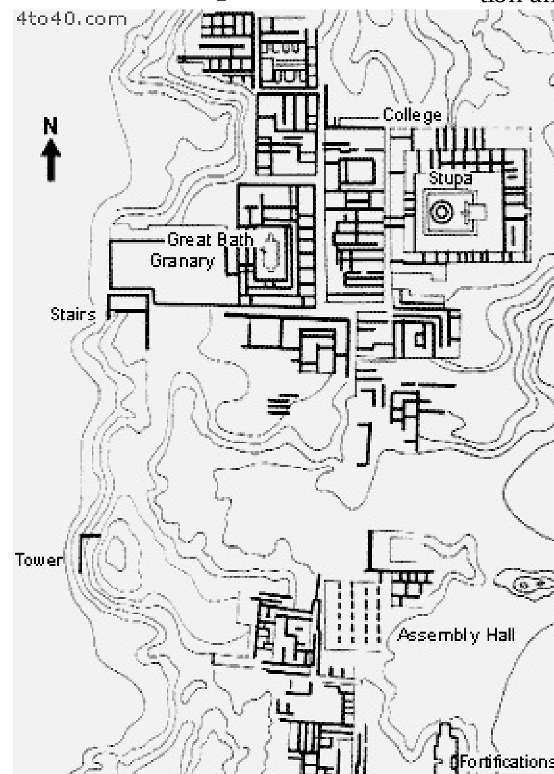
east, conveniently
called the "Lower Town".
1927-1931. Other habitational areas are partly burThere is another small sector ofmeters wide, the 'First Street' in the Lower Townexcavations over the south of the Stupa Mound designated as 'L' area in the oldhad a width of more than 10 meters: it would have allowed two bullock-carts to pass each other with

ied by the silt of the encroaching Indus River and

published plans, which was excavated in 1936. some Indus brick structures are seen eroding into the Indus River itself. No
Citadel Mound is the highest and

cemetery areas has been
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Great functionalis the so-called
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sockets for a wooden superlower mounds (the Lower
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Bath
able evidence, which in
a pillared hall and shell working
dicates shifting centers of
premises. power within the city and
the presence of habita
From the Stupa Mound to the tion and industrial areas



Lower City in each of theis a short walk of a few
major
hundred meters. Here, even in the
numerous large brick limited portions laid bare by the could havehouses that archaeologists' spade, one is likely
The layout of the 'Citadel' section of Mohenjodaro, indi**The layout of the 'citadel' section of Mohenjo-daro, indi-**
cating remains of a few important constructions **cating remains of a few important constructions**
been the residences of

powerful to get lost in the maize of lanes and or
much space to spare. Throughout the larger part of the life of Mohenjo-daro as a city, no encroachments or construction on these roads was allowed.

At Mohenjodaro the presence of city walls and gateways has been controversial, but recent studies (7) seem to confirm that, like Harappa, each major mound was surrounded by an enormous mud-brick wall with gateways at key locations. The western citadel mound, the highest habitation area at Mohenjodaro, is encircled by a massive mud-brick wall which is now eroded down to the modern plain level. Wheeler identified what might be a wall at the southeast corner of the citadel mound, but he never fully published his report. Recent borings along the eroded perimeter of HR area in the lower mounds have revealed the presence of great mud-brick walls or

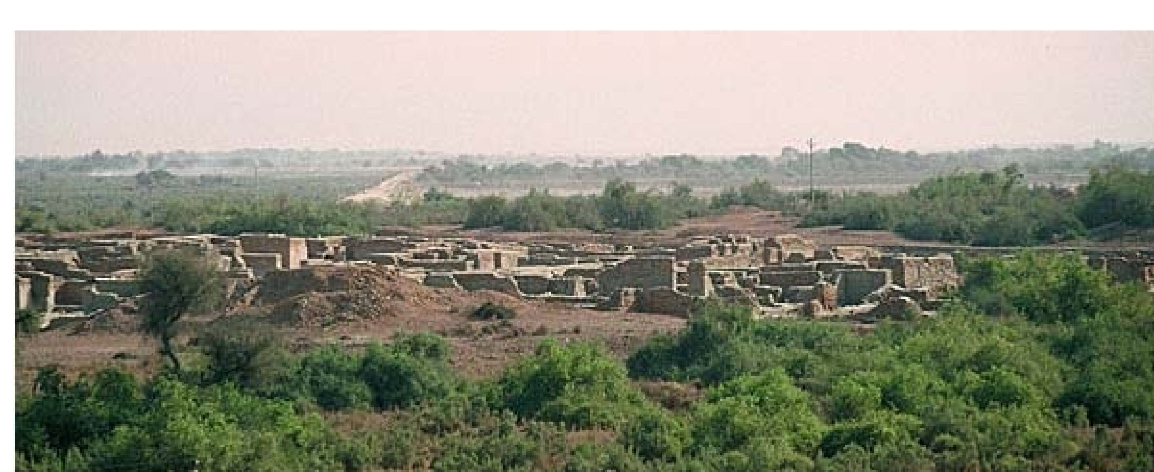
platforms. If these strucmerchantsby-lanes where the view is obstructed by the high standing house walls. On the first visit

members of the elite. No temples have been identitures are indeed the foundations for city walls, they to these ancient ruins, it is better to be accompanied by a guide or equipped with a
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staircase that may have had a ritual function. ered at Harappa.

miniaturized Manhattan. This analogy The excavated remains of Mohenjohas often tempted scholars to label its The limits of the site are ill-defined. The visi daro presents us with a vivid picture of town plan ble space is *ca.* 95 ha, but Jansen's survey has thoroughfares running from north to south as First Street or Second Street.
ning and city architecture by which the Harappan traced ruins up to about 2 km to the east. It is pos

Another analogy for the plan of the mound of the Lower City of Mohenjodaro looks like
Civilization is generally recognized. Some aspects sible that these newly discovered ruins belong only
a magnificent tamarind tree, with its trunk going southwards, and the broad leafyto the late phase of the site's history, but still, the
with in some detail in a separate chapter of this total built-up area is now estimated to be *ca*. 200 tocanopy rising in bellowing masses towards the north. The length of the canopy from
book. Through the various excavations at Mohenjo250 ha. north to south measures nearly 820 meters, its width at the base 720 meters, which
daro, a picture emerges wherein the so-called Hundreds of residential houses and largetapers north to nearly 330 meters. The total area covered by this roughly trapezoid
'acropolis' (high town) or 'citadel' was built upon a buildings, streets and lanes, oriented towards the large platform, constructed with walls of dried mudcardinal points, testify to the architectural sophistiPage 172

that extend to the east. It was originally excavated by K. N. Dikshit in 1924-25; later excavations were carried out by E. Mackay assisted by N. G. Majumdar, H. L. Srivastava, K. N. Puri, D. D. Mathur in 1927-1931.Ancient Pakistan - An Archaeological History



Mohenjodaro DK-G area Mohenjodaro and Southern Cities! Mohenjodaro DK-G area

cation of what seems to have been a Other habitational areas are partly buried by the silt of the encroaching Indus River and planned city. The idea of a planned city

with grid-like street plan and a castrum some Indus brick structures are seen eroding into the Indus River itself. No cemetery type layout was first postulated by Stuartareas has been located at the site, though there have been reports of occasional chance Piggott and later supported by Sir Mor

timer Wheeler. Later research by the burials discovered in the course of site conservation.

Research Project Mohenjodarp at

Earlier scholars thought that the various mounds at Mohenjodaro represented Achen, Germany (11), has cast doubt on
the concept of a grid plan but there is nocontemporaneous occupations in a city divided into distinct functional sectors, the doubt that Mohenjo-daro was a deliber western mound (the 'Citadel') being administrative center and the lower mounds ately planned city. We shall discuss this controversy in the chapter on town planrepresenting habitation and industrial areas for the common populace. This simplistic ning. In the followings we shall attemptinterpretation is no longer supported by the available evidence, which indicates shiftingto review the salient features of this town

planning and look at some architectural centers of power within the city and the presence of habitation and industrial areas in

remains that have been laid bare at Mohenjo-daro through the excavations outlined above. They will be visited



Indus River and the Lower Town



VS area, situated directly east of the citadel mound

VS area, situated directly east of the citadel mound Page 173

Stratigraphic Context: A bird's eye view of the excavated remains in the Lower City may give a

misleading concept of the layout of the

settlement at varying levels, unless one bears in again in the chapter on the Harap

mind the fact that these are not the remains of pan Architecture in context with buildings erected in one period alone. Actuallytheir relevance to the style and they are the cumulative result of at least 500

form of the Harappan architecture years of building, demolition and rebuilding of as a whole.
the structures. The varying heights of the doors It is the architecture of Mohenjosuggest at least seven different levels ofthat delineates the materialoccupation, though there may be substantially daro

more, as the borehole sections show occupation contours of this intriguing civilizafloors situated 11.9 meters below the present tion in the Greater Indus Valley, and surface levels. A constant rise in the occupation it is the town planning of Mohenjo

levels at Mohenjodaro is revealed by the chimneydaro that practically defines the-like brick masonry of wells dug by later spirit of the Harappas. In this re occupants of the city from the ground levels of therefore, the study oftheir time. Such wells, especially notable in thespect,

D.K. area, are sunk deep down, in many cases Mohenjo-daro's excavations is es



cutting through the floors of the bed-chambers or sentially the study of the material kitchens of the earlier houses. aspects of the Harappan Civilization itself. The scientific value of the

Page 176 structural remains of Mohenjodaro in the study of Harappan Civilization lies in the fact that, whereas the archaeological remains of Harappa itself had been much disturbed and robbed of bricks by railway contractors before their proper excavation, the mounds of Mohenjodaro were discovered in an almost undisturbed state.

Residential Houses: The houses at Mohenjodaro are built with bricks of nearly uniform dimensions, 27.94 cm in length. 13.42 cm in breadth, and 6.35 cm thick. The average weight of a single brick is such that one person can easily hold it up with

The designs and sizes of the houses indicate some variations in the social status of the owners but not very clearly. Some houses are larger than others with more suites of rooms and larger courtyards. The courtyards are normally placed towards the northern side of the houses. The entrances lie through antechambers or rooms accessible from the narrower side lanes. In some cases, they are also opened in the courtyards bordered by a street. This feature of house construction remained alive

Mohenjodaro and Southern Cities**!**



The so-called first street in the 'Lower Town' of Mohenjodaro

The so-called first street in the 'Lower Town' of Mohenjodaro one hand. This factor is indicative of the
economy of the labor force employed in

the construction of houses. The profusioncourtyards bordered by a street. This feature of house construction remained alive evenof burnt bricks used in all constructions today: the majority of the houses of the Hindus in towns of Punjab opened on the side also indicates a broad-based commercial tradition of a brick-making industry. Somestreets, the entrance was into a small room before it ushered into the courtyard. Houses scholars have tried to build up an argu of the poor generally opened on the main street and entrance was directly into the ment of radically different climatic conditions in the times when Mohenjo-daro was courtyard. Such houses can still be seen in small towns of Punjab and the NWFP; they flourishing on the evidence of mass-scaleconform with the general picture of the floor plans dug out at Mohenjodaro.production of burnt bricks, for it suggests plenty of firewood which in the present The outer walls of the houses are mostly

plain and featureless, except where broken by climatic conditions seems doubtful. Furthermore, they question the use of bakedthe entrance doors or rubbish chutes. Even a cursory glance at the layout of the different bricks in preference to the mud bricks ifhouses suggests that they were also used for other purposes than residential alone. Some the climate was not substantially wetter of the houses with larger courtyards probably served as industrial units for the potter's,then. Other studies, however, have indi



cated more or less the same type of dry carpenter's, or wheelwright's trade. The dyer's shop in the H.R. area is a clear example weather throughout the Harappan periodof the commercial use of the built-up areas. Here we find rows of conical depressions, as today. HR area
lined with rubbed bricks to provide secure bases for the dyer's vats. This tradition of

living and working in the same quarters still persist all over Pakistan. For example, a
large quantity of fancy hand-woven silk comes from such'house-factories' of Korangi in Karachi .

even today: the majority of the houses, especially those among the Hindus in pre-Partition towns of Punjab, opened on the side streets, the entrance was into a small room before it ushered into the courtyard. Houses of the poor generally opened on the main street and entrance was directly into the courtyard. Such houses can still be seen in small towns of Punjab and Sindh; they pretty much conises. Potter's wheel is invariably situated in the residential house of the potter all over Punjab and the Pashtun country, so is the case with other artisans such as shoemakers, jewelers, stone cutters, etc.

different
times when
in the
of the
and larger



A side street at Mohenjodaro

A side street at Mohenjodaro

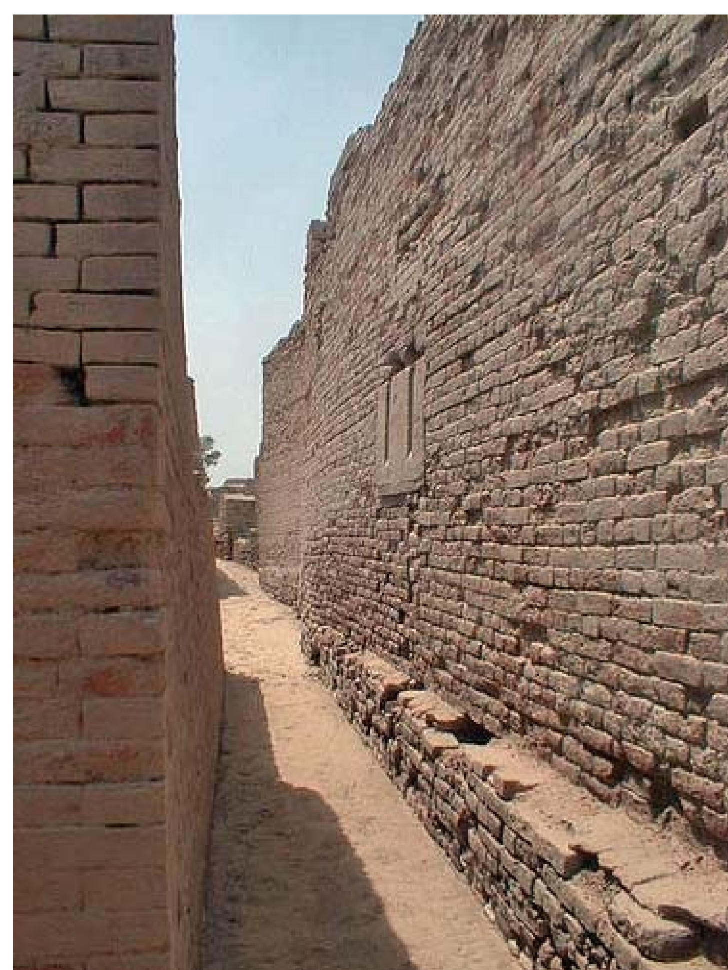
Page 185 form with the general picture of the floor plans dug out at Mohenjo-daro.

The outer walls of the houses are mostly plain and featureless, except where broken by the entrance doors or rubbish chutes. Even a cursory glance at the layout of different houses suggests that they were also used for other purposes than residential alone. Some of the houses with larger courtyards probably served as industrial units for the potter's, carpenter's, or wheelwright's trade. The dyer's shop in the H.R. area is a clear example of the commercial use of the built-up areas. Here we find rows of conical depressions, lined with rubbed bricks to provide secure bases for the dyer's vats. This tradition of living and working in the same quarters still persist all over Pakistan. For example, a large quantity of fancy hand-woven silk comes from such 'house-factories' of Korangi and Banaras Town in Karachi, where artisan

Almost every house had a stairway leading up; water pipes, and chutes within the walls used for disposing of matter from above are frequently found; windows on the level of streets and lanes are infrequent but on the level of ceiling are common. Again, it is a common feature in the traditional houses all over the present-day Pakistan, where the street-level windows are rare but the openings under the ceiling (the *Rowshandans*) are common.

Many of the rooms are so small as to bar their use for living purposes. This kind of evidence, coupled with the presence of stairs in almost all houses, makes it certain that the families resident at Mohenjo-daro lived in upper stories, made most probably of wood supplemented by reed matting, or light screens of mud brick. This is apparently confirmed at Kot Diji, where reed mat-marked impressions were found in the Harappan levels. Another

theory is that the people of Mohenjo-daro spent houses, makes it certain that the families resident at Mohenjodaro lived in upper stories,most of their time, especially in the evenings and made most probably of wood supplemented by reed matting, or light screens of mud



Another side street at Mohenjo-daro

families work and live within the same prem

brick. This is apparently confirmed at Kot Diji, where reed mat-marked impressions nights, on the open roofs. This type of living, under were found in the Harappan levels. Another theory is that the people of Mohenjodaro added feature: outside one wall of these wash lines the response to the climate that man mustspent most of their time on the open roofs. This type of living, underlines the response make to flourish in Sindh and Punjab. For the same

They are so arranged that they could provide an
to the climate that man must make to flourish in Sind. For the same reason, the use of reason, the use of the roof and the courtyard for easy means for a servant, or member of the family,
the roof and the courtyard for sleeping purposes is still common all over Pakistan, sleeping purposes is still common all over Pakistan. to pour water on the bather, thus making these

In the Lower Town, there is a very large particularly in Sind and Punjab. more like shower rooms rather than ordinary washhouse which may deserve even to be called a nota rooms.
ble's palace: it is nearly 300 square meters in area

In the Lower Town, there is a very large house which may deserve even to be called a
'**Wasserluxus':** Jansen (11) sees Mohenjo

and ultimately contained some twenty rooms set daro as defined by three Indus innovations: bathing notable's palace: it is nearly 300 square meters in area and ultimately contained some around a courtyard. Another large house was aptwenty rooms set around a courtyard.platforms, brick-lined wells, and sewerage disposalAnother large house was apparently nonMohenjodaro and Southern Citiesresidential, and could be a temple: two staircases opposite to each other led to the upper l o c a t i o n o f t h e w e l l s storey, and a number of vessels of alabaster and objects of faience and ivory were found

throughout the city was
here along with fifteen seals, many depicting the mythical single-horned humpless bull ('unicorn').
also planned from the be
ginning, a contention that
can be supported. Similarly,
At the end, mention should be made of Moneer's excavation once again. Jansen and
the disposal system of city
Dale describe the neglected excavation of Moneer and report the general appearance of
sewerage must be an inte
the architecture described in the report as different from those experienced from other
ning. In any event, they are
parts of the city. The structures seem smaller, with thinner walls in general, and though interesting facilities. Plan neatly oriented and arranged along straight streets and lanes, they seem to be more
ning on this scale, especially planning that was crowded. A most peculiar feature of the structures is what appear to be triangular shaped
corbelled holes through most of the walls just above the floor level. Another peculiar
accompanied by the will
architectural feature at the Moneer site is an apparent modification of the well-known,
reality, is something special
ubiquitous bathing floors with their finely constructed brick floor and drains. These are


for the third millennium common at most other parts of Mohenjodaro but at the Moneer site they have an B.C. A meticulous attention
interesting added feature: outside one wall of these washrooms there is usually a small
to the supply of fresh water,
flight of brick steps. They are so arranged that they could provide an easy means for a
the disposal of used water
servant, or member of the family, to pour water on the bather, thus making these more like shower rooms rather than ordinary washrooms.erous use of water for per
A staircase in a Mohenjodaro house. Such stairs are a common feature of the Indus
A staircase in a Mohenjo-daro house. Such stairs are architecture (after Kenoyer)





The designs and sizes of the houses indicate A private bathroom at Mohenjodaro. These ‘bathing platsomefrom those experienced from other parts of theof the **A private bathroom at Mohenjo-daro. These ‘bathing plat-** city. The structures seem smaller, with thinner forms’, appear to be a standard feature of Mohenjodaro’s owners. Some houses are larger than others **forms’, appear to be a standard feature of Mohenjo-daro’s resi**
Wasserluxus:

a common feature of the Indus architecture
build up an argument of radically different
climatic conditions in the times when

parently non-residential, and could be a temple:
Mohenjodaro was flourishing on the evidence
two staircases opposite to each other led to the
of mass-scale production of burnt bricks, for it
suggests plenty ofroof, and a number of vessels of alabaster andin the
objects of faience and ivory were found here
present climatic conditions seems doubtful.

along with fifteen seals, many depicting the
Furthermore, they question the use of baked
mythical single-horned humpless bull (the 'uni
bricks in preference to the mud bricks if the
corn').climate was not substantially wetter then. Other

At the end, mention should be made of

studies, however, have indicated more or less
Moneer's excavation once again. Jansen and
the same type of dry weather throughout the
Dale describe the neglected excavation of Mon
Harappan period. eer and report the general appearance of the
architecture described in the report as different

Mohenjodaro three Indus innovations: bathing platforms and brick-lined wells, coupled with sewerage disposal

firewood which

system. He believes that the location of the wells throughout the city was also planned from the beginning, a contention that can be supported. Similarly, the disposal system sewerage must be an integral part of the city planning. In any event, they

variations in the social status facilities. Planning on this scale,
especially planning that was with
more
suites
of
rooms
and
walls in general, and though neatly oriented and
larger
arranged along straight streets and lanes, they
courtyards. The courtyards are normally placed
seem to be more crowded. A most peculiar fea
towards the northern side of the houses. The
ture of the structures is what appear to be triangular
entrances lie through antechambers or rooms
shaped corbelled holes through most of the walls
accessible from the narrower side lanes. In
some cases, theyjust above the floor level. Another peculiar architec A side street at Mohenjodaro
are also opened in the

tural feature at the Moneer site is an apparent modification of the well-known, ubiquitous bathing floors Page 185 with their finely constructed brick floor and drains. These are common at most other parts of Mohenjodaro but at the Moneer site they have an interesting

residential houses **dential houses**

Page 188 sonal hygiene is evident at Mohenjo-daro to such an extent that one can call it an obsession. Jansen calls it *wasserluxus*, that is, water-luxury.

Fresh water was supplied by a network of wells, sunken cylindrical shafts several meters deep built of wedge-shaped, standard-size bricks. The waste water and other sewage of almost every house was

channeled into the drain running along

walls of dried mud-brick to retain the infills behind. Similar platforms were built for blocks of houses in the larger 'Lower Town'. The initial platforms were some 10 meters



high, but were further raised or extended from time to time: these platforms enabled

houses in the city to be built above the flood level. Spaces for roads were marked well



before houses were built, so

As the houses were built, a remarkably careful drainage system was laid outthat Mohenjodaro had long

throughout the city of Mohenjo-daro. Each broad roads had its wasterunning parallel
house water running out, with other roads, with lanes sometimes through terracotta pipes fitted together, into a cesspit which connected
meeting them at right angles.
with the drain running alongside the road While a main street in the
and sometimes through the middle of the
acropolis was 6 meters wide,

street. The street drains along the main the 'First Street' in the Lower roads could be covered, and sometimes
had man-holes. Larger drains had cor

Town had a width of more
belled, burnt-brick roofing, to enable clean
than 10 meters: it would have
ers to enter them. Most of the drains ulti
allowed two bullock-carts to mately ended in soak-pits within the city by
the roadside, and might well have over
pass each other with much
Drain outlet at the Great Bath. At the southern corner of the sloping floor, a small drain first flowed from
time to time. Despite such limi passes through the massive walls of the tank and connects to a corbelled arch drain along the
space to spare. Throughout the tations, the drainage system of Mohenjo
A well located DK-B area. It was originally surrounded by a paving
A well located DK-B area. It was originally surrounded by a
which has recently been reconstructed
paving which has recently been reconstructed
religious occasions. It would seem that
the street outside. A standard domestic conven
the chief priest and some of his
ience was the indoor ‘bathroom’, a small area of not
more than 2 square meter which was paved with
larger part of the life of daro stands unique among the Bronze Age

Mohenjodaro cities of the world.as a city, no encroachments or construction on these roads was allowed.

At Mohenjodaro the presence of city walls and gateways has been controversial, but

specially sawn bricks of high quality and surrounded descending into the water pool from
recent studies seem to confirm that like Harappa, each major mound was surrounded by
by a low brick rim to form a shallow basin. A specialeither of the northern or southern steps

outlet in the outside wall allowed the effluent to flow into a soak pit or straight into the street drain. Such
and wading across slowly to the other

bathrooms are still a common feature in traditional end, chanting hymns and prayers to the houses in small cities and towns of Punjab anddeities. The rest of the gathering Sindh. The construction is surprisingly similar, even

standing in the surrounding pavilion the area of the platform is comparable.
might have joined them in offering

ovations to the gods. It is also plausible that the chief shaman or a group of celebrated holey men used this body of water to ward of evil spirits or community curses by performing their trans-evoking magic through the use of their secret *mantras*, as it became quite popular with the later Hindu traditions in north India.

**A corbelled drain from the Great Bath**

A corbelled drain from the Great Bath

Public Buildings: Unlike the Bronze Age

The Granary: A second interesting architectural feature on the Stupa Mound is the



A latrine at Mohenjo-daro

cities of Mesopotamia, Indus cities are not particu
larly known for their public buildings, such as tem

Page 181 ples and palaces. Nevertheless, they are not devoid of any public structures: some public structures at Mohenjo-daro are briefly reiewed in the followings.

The Great Bath : The most celebrated architectural remain at Mohenjo-daro is the Great Bath situated in the S.D. area of the Stupa Mound, the so-called ‘citadel’ It is a beautifully laid-out rectangular pool constructed in brick, measuring 11.9 meters in length and 7 meters in breadth - the longitudinal axis oriented north-south. The pool, which is 1.9 meters deep, has flights of steps at the northern and southern ends. Originally it seems to have been surrounded by a pavilion and a row of adjacent chambers. The rectangular pool was kept open to the sky. It wes supplied with water drawn from a double-ringed well situated outside the eastern wall Harappan Civilization - The Material Culture

Mohenjodaro and Southern Cities!  **An example of public drainage system at Mohenjo-daro**

accompanied by the will and means to bring it into reality, is something special for the third

have been collected for this purposes, but no inlet accompanied by the will and

drains have been found. millennium B.C.

means to bring it into reality, is
In the area to the north of the Great Bath at
something special for the third
Mohenjo-daro, there was a block of eight bath

millennium B.C. Nowhere is this sophisticated

rooms, arranged in two rows of four, each with a

planning more impressive than

flight of stairs leading to an upper story. It has Nowhere is this sophisticated

been plausibly suggested that this housed people the structural features relating

planning more impressive than

(priests?) associated with the Great Bath. A nearby to the the structural features relating water supply and open courtyard may have been associated with the to the water affluent disposal system. Fresh

supply block but was separated from it by the street that

affluent disposal system. Fresh ran between the east side of the Great Bath and asupplied by a water was water bywas supplied a of wells, sunken network of wells, network sunken

cylindrical
shafts

cylindrical shafts several
several *The sewer is the conscience of the city.* meters deep builtmeters deep built of wedge Victor Hugo, *Les Miserables*
shed, standard-size bricks. The shed, standard-size bricks. The waste water and other sewage waste water and other sewage of almost every house was house was channeled intolarge complex known as the College. In the latter of almost every

the drain
there were many small rooms, often faced with

running drainbrick, and several courtyards, including a large onealong channeled street into the outside. surrounded by a fenestrated walkway. At leastrunning along the street

A
standard

outside.seven entrances gave access to this complex,

domestic
suggesting it was composed of a number of indiconvenience was the indoor

A
standard

vidual residences or fulfilled a number of functions,domestic

perhaps related to administration. Two flights of

convenience was the indoor

stairs in the complex show that the building had an



of the enclosure. The water drawn up in buckets
was let into a covered drain passing beneath the
floor of the cloister. The pool must have been kept
clean by draining off the stagnant water through
another covered drain towards its south-western

Two examples of public drainage system
corner. The outlet drain with a corbelled arch can
at Mohenjodaro
be traced to some length. It led the used water
outside the built-up areas of the Stupa Mound
'bathroom', a small area of not more
towards the low ground.
than 2 square meterd which was paved
A close inspection of the Great Bath reveals
Two examples of public drainage system
with speciallymany features suggesting that extraordinary care

quality and surrounded by a low brick
was taken in its construction. For instance, the
rim to form a shallow basin. A special
water pool had a floor of bricks set in gypsum to

make it watertight. The masonry linings of the re‘bathroom’, a small area of not more

taining wall had been provided with a packing of

effluent to flow into a soacvk pit or than 2 square meterd which was paved

straight into the street drain. Such bitumen to prevent lateral seepage of water. The

with specially sawn bricks of high

bathrooms are still a common feature steps going down into the pool seem to have car



ried wooden batons to protect the edges, and also quality and surrounded by a low brick

perhaps to prevent them from becoming slippery.

and towns of Punjab and Sind. The rim to form a shallow basin. A special

The floor of the tank is water tight due to

outlet in the outside wall allowed the

finely fitted bricks laid on edge with gypsum plas



ter and the side walls were constructed in a simieffluent to flow into a soacvk pit or

lar manner. To make the tank even more water

straight into the street drain. Such

tight, a thick layer of bitumen (natural tar) was laid

along the sides of the tank and presumably alsobathrooms are still a common feature

beneath the floor. Brick colonnades were discov
ered

in traditional housdes in small cities

on the eastern, northern and southern

edges.
The
preserved
columns
have

and towns of Punjab and Sind. The

stepped
edges that may have held wooden screens or
window frames. A series of rooms are located
along the eastern edge of the building and in one Page 189**Another example of public sewage system**room is a well that may
have supplied some of the
water needed to fill the tank. Rainwater also may

upper story.A private well. Generation after generation the same well kept on being used. The walls of the

The cloistered area of the Great Bath origithough Kenoyer has suggested that they may indi

nally appears to have had two entrances each onwell kept on rising as the general level of the city kept on rising. The result is a chimney-like the northern and southern sides, and one opening tivities that took place here. This building bore some
on to the eastern side. The northern and southernstructure with a bricks of several centuries piled on each other (after Kenoyer) entrances were symmetrically disposed on either continent, such as the Mauryan pillared hall at

Pataliputra and Buddhist monastic halls. It has been suggested that this hall was used for public gatherings. It formed part of a larger complex, reminiscent of Near Eastern palaces in the mixture of large courtyards and other public spaces, shrines, and residential quarters; these served both as centers of administrative, legal, economic, and political activity and as the residence of the rulers and their large households. A suite of rooms south of the Pillared Hall included an unusually high proportion of bathrooms; in the western block there were a number of small rooms probably for storage, a smaller hall with rectangular piers to support pillars, containing large-scale cooking facilities, and a long chamber adjacent to a large well. In a badly disturbed hall located farther west, the presence of

ring stones suggests that there were wooden col

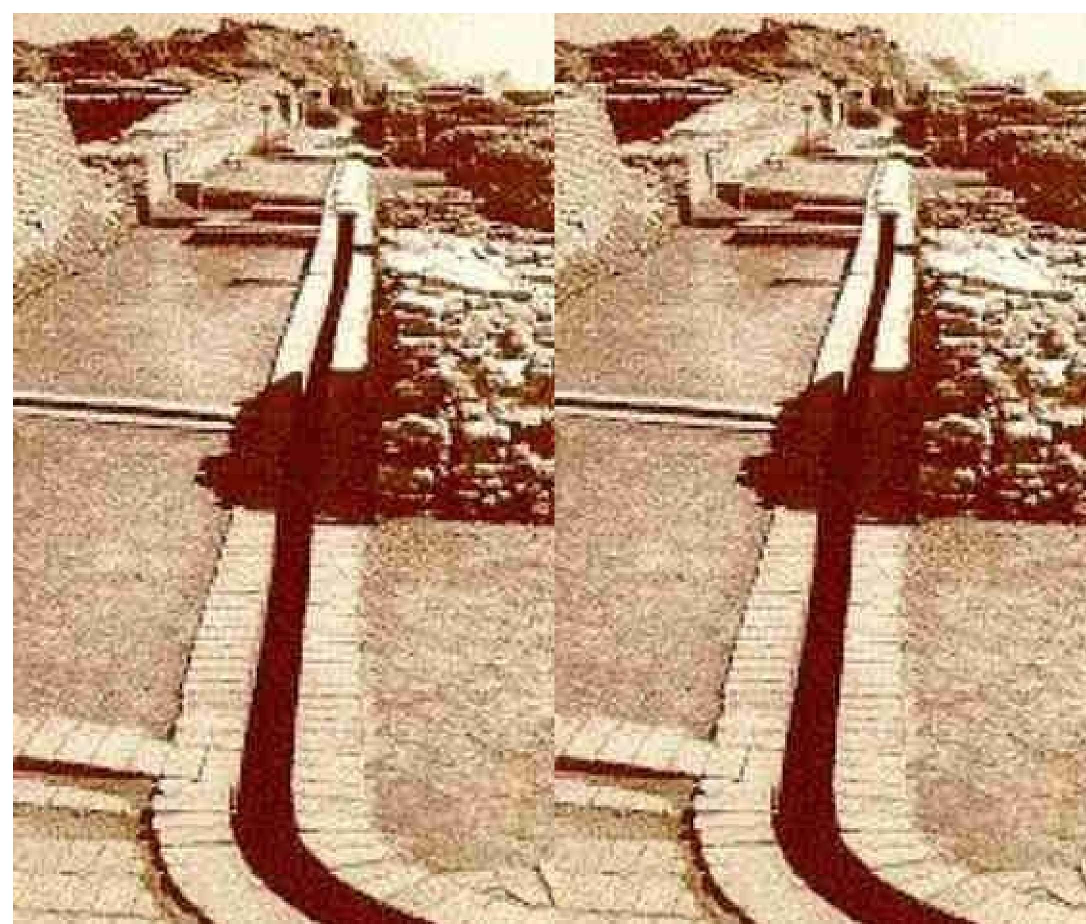
A private well. Generation after generation the same well kept on being used. The walls of the

umns. One secluded room may have been a

well kept on rising as the general level of the city kept on rising. The result is a chimney-like

tures of people, a high proportion of the very few

structure with a bricks of several centuries piled on each other (after Kenoyer)



A municipal sewage drain, connected with individual

A municipal sewage drain, connected with individual

pieces of Harappan stone sculpture known, were


side of the longitudinal axis. One of the southern entrances was later closed up by a brick wall. Out

house drains (capped)

side the building towards the north, across a brickpaved lane, there is a double row of public toilets, with their entrances arranged in contraposed positions for the sake of privacy. This area of public convenience was probably a part of the establishment of the Great Bath. At the southern corner of the sloping floor, a small drain first passes through the massive walls of the tank and connects to a corbelled arch drain along the outer wall of the tank.

Farther south was a large hall with

A municipal sewage drain,

brick bases for four rows of five pillars, paved with

connected with individual 161house drains (capped)
construction surprisingly even the area platfor m comparable. As the houses were built, careful system throughout the city of A covered municipal drain Mohenjodaro. house had its waste

Page 190 water sometimes terracotta pipes fitted together, into a cesspit which

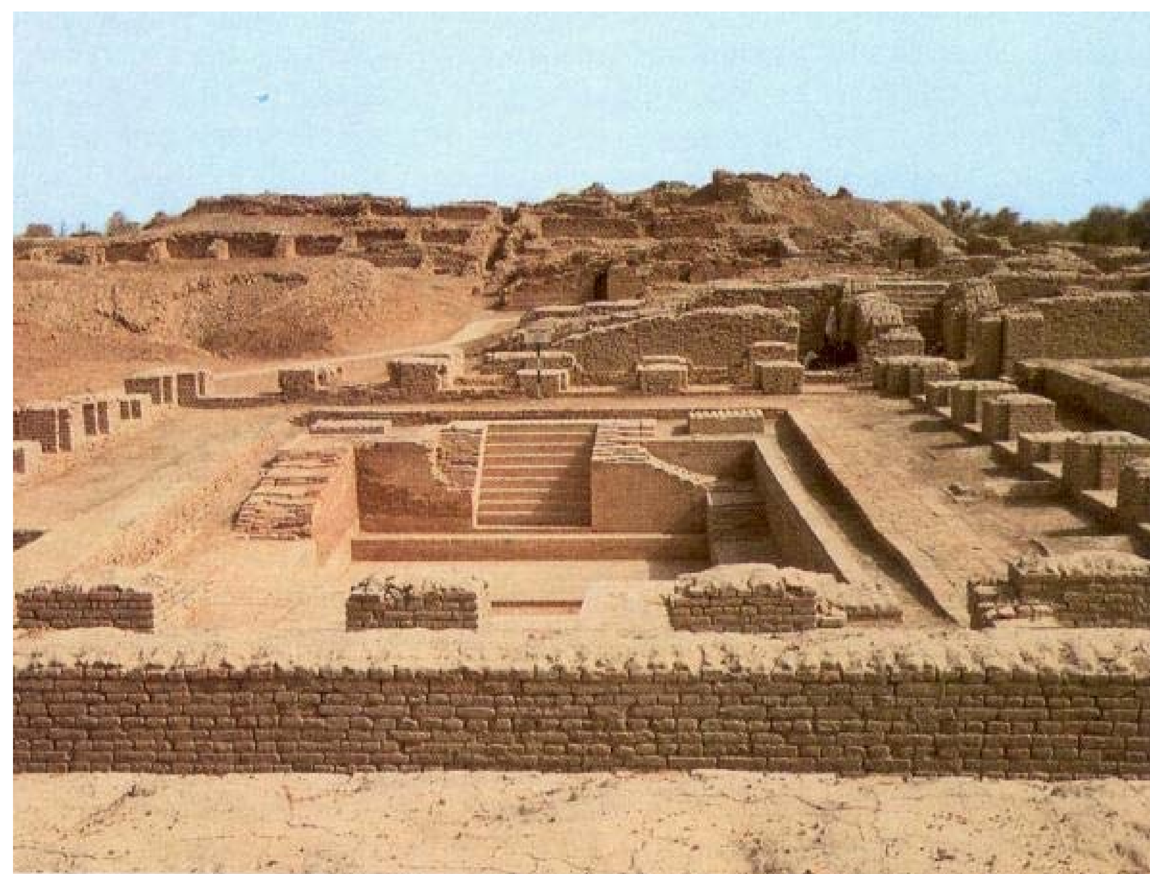
A covered municipal drain

A covered municipal drain
with the drain running alongside
Page 190
becoming slippery.

Harappan Civilization - The Material Culture found in parts of this complex.

From its architectural appearance, the whole complex of the Great Bath seems to have carried some ritualistic significance. It was most probably a place for social gatherings of the elite of the city on religious occasions. It would seem that the chief

priest and some of his ministers performed the litur
excavations outlined above. They will be visited again in Chapter 9 and 10 in context
gies by descending into the water pool from either
with their relevance to the style and form of the Harappan Civilization as a whole. It is of
the
northern
or
southern
steps
and
wading
the architect of Mohenjodaro that delineates the material contours of this intriguing
across slowly to the other end, chanting hymns and civilization and it is the town planning of Mohenjodaro that practically defines the spirit
of the Harappans. In this respect, therefore, the study of Mohenjodaro's excavations is essentially the study of the material aspects of the Harappan Civilization itself.


The Great Bath

The Great Bath at Mohenjo-daro

The Great Bath : The most celebrated architectural remain at Mohenjodaro is the Great Bath situated in the S.D. area of the Stupa Mound. It is a beautifully laid-out rectangular pool constructed in brick, measuring 11.9 meters in length and 7 meters in breadth - the longitudinal axis oriented north-south. The pool, which is 1.9 meters deep, has flights of steps at the northern and southern ends. Originally it seems to have been surrounded by a pavilion and a row of adjacent chambers. The rectangular pool was kept open to the sky. It was supplied with water drawn from a double-ringed well situated outside the eastern wall of the enclosure. The water drawn up in buckets was let into a covered drain passing beneath the floor of the cloister. The pool must have been kept clean by draining off the stagnant water through another covered drain towards its south-western corner. The outlet drain with a corbelled arch can be traced to some length. It led the used water outside the built-up areas of the Stupa Mound towards the low ground.



At the southwestern corner of the sloping floor, a small drain first passes through the massive walls of the tank and connects to a corbelled arch drain that curves along the edge of the northern terrace of the granary to the west.

prayers to the deities. The rest of the gathering standing in the surrounding pavilion might have joined them in offering ovations to the gods. It is also plausible that the chief shaman or a group of celebrated holy men used this body of water to ward of evil spirits or community curses by performing their trans-evoking magic through the use of their secret *mantras*, as it became quite popular with the later Hindu traditions in north India.

The cloistered area of the Great

The Granary: A second interesting architec

tural feature on the Stupa Mound is the podium of Bath originally appears to have

the great "Granary" situated on the western flank.

had two entrances each on the

From an analogy with a similar granary studied earlier in the excavations at Harappa, Sir Mortimer

northern and southern sides, and

Wheeler was able to demonstrate its purpose as a

one opening on to the easternState Treasury by reconstructing it in drawings to

show its various functional parts. The podium of the

building, made of solid brick square-shaped platside. The northern and southern

forms separated by a gridiron of straight and narrow

entrances were symmetrically


A close-up of the Great Bath

A close-up of the Great Bath

passages, is thought to have been covered by a floor of wooden boards, and probably the superstructure was also made of wood. This hypothesis is supported by observationn of the narrow vertical grooves on the peripheral edges of the outer rows of the square platforms, indicating that they were meant for fixing vertical wooden beams to bear the

load of the superstructure. The gridiron of the straight narrow aisles in the podium, as argued by Sir Mortimer Wheeler, was made to provide air ducts which could keep the floor of the grain storage dry and safe from mildew. A quantity of charred grains of wheat collected from the excavations gives some credence to the presumed nature of the building.

The Great Bath in ground plan (after Jansen)

disposed on either side of the longitudinal axis. One of the southern entrances was later closed up by a brick wall. Outside the building towards the north, across a brick-paved lane, there is a double row of public toilets, with their entrances arranged in contraposed positions for the sake of privacy. This area of public convenience was probably a part of the establishment of the Great Bath. From its architectural appearance, the whole complex of the Great Bath seems to have carried some ritualistic significance. It was most probably a place for social gatherings of

Page 180

On its western side, there is also a brickpaved apron, approached from the lane below by a ramp. Wheeler suggests that this could have been the loading platform where bullock carts could be driven up to discharge their load of sacks of grain collected as tax from cultivators. It is interesting to note that the use of this "State Treasury" continued for a long period during the heyday of Mohenjodaro. But the building ultimately fell into disuse with purpose was probably for holding an assembly of some kind (ceremonial or religious); later it was sub-divided, its different parts being walled off.

Located on the western edge of the mound at the southwest corner of the great bath, the foundation of this building appears to have been constructed before the great bath, whose exit drain cuts

across the northeast corner of the foundation. Built

on top of a tapered brick platform, this building had the decline of the city. This is clearly suggested by podium of the great “Granary” situated on the western flank. From an analogy with aa solid brick foundation that extended for 50 meters the remains of shoddy masonry of a well dug closesimilar granary studied earlier in the excavations at Harappa, Sir Mortimer Wheeler waseast west and 27 meters north south. The foundato the “loading platform” at a later period, which left no room for the bullock carts to operate, as seen in Wheeler’s reconstruction.

The Wheeler’s hypothesis that the ‘granary’ building was indeed a granary has its detractors. These scholars point out that the function of the building cannot be determined with any degree of certainty as the premises were excavated by large numbers of local workmen, with no documentation of the stratigraphy or of the precise location of valuable small artifacts. As the matter stands at the present time, there is no con crete evidence for it being a "gran ary" and this term is being dropped in favor of "Great Hall". The building was probably a large public struc ture, but it is not clear if it was a storehouse, a temple or some form of administrative building.

The Pillared Hall: Another inter able to demonstrate its purpose as a State Treasury by reconstructing it in drawings to


Eroded face of the “granary”

Eroded face of the “granary”

show its various functional parts. The podium of the building, made of solid brick
tion was divided into 27 square and rectangular
square-shaped platforms separated by a gridiron of straight and narrow passages, is
esting building in the citadel, in its southern part, is thought to have been covered byblocks by narrow passageways, two running east a
large pillared hall, there being twenty thick brick superstructure was also made of wood. This hypothesis is supported by observation ofwest and eight running north-south (one additional pillars arranged in rows of five each, the whole north-south passageway was added at athe narrow vertical grooves on the peripheral edges of the outer rows of the square about 750 square meters in area. There is no indiplatforms, indicating that they were meant for fixing vertical wooden beams to bear the later cation of what the roof was made of: its original

stage). Some of these blocks had square sockets load of the superstructure. The gridiron of the straight narrow aisles in the podium, as
for holding wooden beams or pillars. It is believed argued by Sir Mortimer Wheeler, was made to provide air ducts which could keep the

that the entire super structure was floor of the grain storage dry and safe from mildew. A quantity of charred grains of made of timber.
wheat collected from the excavations gives some credence to the presumed nature of the

building.
Behindthepillaredhallat Mohenjo-daro are the remnants of a On its western side, there is also a brick-paved apron, approached from the lane below
fine paved room some twenty-two

by a ramp. Wheeler suggests that this could have been the loading platform where feet in length from north to south that
bullock carts could be driven up to discharge their load of sacks of grain collected as tax

is linked by its paving to the main hall.
from cultivators. It is interesting to note that the use of this "State Treasury" continued for a long period during the heyday of Mohenjodaro. But the building ultimately fellUnfortunately, the eastern portion of
these structures has been destroyed,
into disuse with the decline of the city. This is clearly suggested by the remains of



What mains remains of the pillared hall today

but it would appear that behind the

 main hall and its annex on the south was a walled court with a well. To the northeast and apparently contiguous with the Pillared Hall complex was a series of small chambers belonging to a large structure. One of these chambers contained a dark stone apparently placed in its situation with deliberate purpose. Since this stone is of large size (2' by I' 7" by I' 1⁄2) and its top is flat and polished, it is difficult to ignore it. It merely accentuates the Harappan Civilization - The Material Culture

p r o b l e m s o f i n t e r p r e t i n g t h e s e r e m a i n s .

This building complex of the pillared hall, located as it is in such a prominent position, must have played a significant role in the life of the city. Yet nothing found in association even hints as to its role. One cannot help but speculate, however, that it was constructed in response to a formality urged by religion or government. Was it indeed a place of assembly or perhaps a place of audience? Wheeler rightfully refers to the Achaemenid pillared hall of audience, the *apadan*, in this context, and such a comparison is certainly called to mind. Marshall thought the spaces left between paving strips in the aisles of the main hall might have supported benches. An interesting feature occurs before the northern entrance of the hall. Three circles of brick were found, measuring some three feet across and three feet high, which almost certainly protected the vulnerable trunks of trees whose shade would have been welcome whatever the purpose of those who visited the main building. Thus, present speculations are directed to more or less the same conjecture.

One thing which clearly stands out from observation of these few important architectural remains on

the Stupa Mound is that this part of ancient Mohenjo-daro in its prime was the chief administrative center of the city. From its elevated position above the flat countryside and the rooftops of the Lower City sprawling on the eastern side, one can visualize the watchful gazes of the protectors of the law of the land.

Stratigraphic Context: A bird's eye view of the excavated remains in the Lower City may give a misleading concept of the layout of the settlement at varying levels, unless one bears in mind the fact that these are not the remains of buildings erected in one period alone. Actually they are the cumulative result of at least 500 years of building, demolition and rebuilding of the structures. The varying heights of the doors suggest at least seven different levels of occupation, though there may be substantially more, as the borehole sections show occupation floors situated 11.9 meters below the present surface levels. A constant rise in the occupation levels at Mohenjo-daro is revealed by the chimney -like brick masonry of wells dug by later occupants of the city from the ground levels of their time. Such wells, especially notable in the D.K. area, are sunk deep down, in many cases cutting through the floors of the bed-chambers or kitchens of the earlier houses.

The process of building up the cultural mound at Mohenjo-daro has been assisted to a great extent by flood depositions by the river Indus. The average rate of thickening of the alluvial deposits in the lndus plains has been estimated at 18 cm per century. In many parts of the excavated sections, the cultural debris shows clear indications of waterborne sand and silt layers intervening between two successive occupation levels. This brings out the hard fact that Mohenjo-daro in its lifetime weathered many storms and floods, emerging every time more resolutely determined to survive. But the war of attrition fought by its inhabitants against the forces of nature for some one thousand years finally took its toll, probably in one of the severest floods, when the civilization was already in the last phases of decline. The end of Mohenjodaro in a 'sea of mud' is an attractive theory, advanced by Robert L. Raikes (16) and George F. Dales (17), which rivals Wheeler's theory of a wholesale massacre of its inhabitants by the murderous Aryan hordes.



A brick-lined well in DK-G Area. When archaeologists excavated the fill around the well they were left standing to show the final levels of use.

The stratigraphic studies of an archaeological site are helpful in determining the chronological development of its cultural stages. Such studies are, however, lacking in the case of Mohenjo-daro. This is because of the two main reasons. First, the field techniques of archaeology in the early 1920s were not adequately developed to tackle the tremendous task with any deftness and precision. The method used for determining the relative ages of the structures, for instance, was by a comparison of their levels with a hypothetical datum calculated from the mean sea-level. The concept of stratigraphy as a more secure basis for determining the relative ages was not given due cognizance until Sir Mortimer Wheeler introduced it as a fundamental necessity in all archaeological studies. Second, In all of the excavations mentioned above, Mohenjo-daro’s occupation reached, let alone the level of the first settlement, because the alluvial deposition of the centuries has raised the level of the plain by more than thirty feet, and the water table has risen correspondingly. The present ground-water table is abnormally high, only about fifteen feet below plain level.

The failure of the early excavators of Mohenjodaro to record exact stratigraphic relations of the structural features, as well as the precise location and layers of the movable cultural material in the excavated areas, has raised many problems of interpretation and interrelationship between various objects and their cultural significance. Most of the interpretations seem to proceed from preconceived models of society in the Bronze Age. In order to obtain a fuller picture of the stratigraphic relations between the structures and the small finds, Sir Mortimer Wheeler started a limited excavation at some of the selected spots in 1950. His scheme failed, however, when he reached the saturation level of the groundwater table below which it became impossible to record stratigraphic layers. A second attempt

at salvaging the stratigraphy of the site was made by George F. Dales during 1964-65, when he laid an extensive trench on the western flank of the H.R. area of the Lower City. With a vast quantity of cultural material collected from the trench and the stratigraphic and borehole data recorded.

Test borings made during the 1965 showed that the lowest level of occupation - at least in the areas of the borings at the southern part of the site - is thirty-nine feet below plain level. Thus, the earliest twenty-four feet of occupation levels are submerged in ground water. On the basis of two deep borings in the present plain outside the HR section, Dales wrote that the traces of occupation were found till a depth of 12 m below the present ground level. The height of the mound above the present ground level was 10.5 m.. This means that the total occupational deposit in this part of the mound is 22 m in all. The sub-soil water was encountered at the depth of only 4.5 m below ground level, and this meant that the excavator had to leave 7 m of occupational deposit at that point unexcavated. This tells us very clearly that the early level of Mohenjo-daro is unknown.

In spite of the difficulties in reaching and exploring the lower levels of occupation, we do have some idea of what lies below. The studies of Wheeler as well as Dales indicate that the earliest occupation levels of the site which currently lie buried below the water table, date to around 3500 BC, during the Kot Diji Phase of the Early Indus Period. These levels were first discovered in the small-scale excavations at the northwest corner of the western "citadel" mound by Wheeler in 1946. The pottery the bottom of the

has never been

165 from these levels is similar to that found in the Early Indus (or Kot Dijian) levels of the nearby sites of Jhukar and Kot Diji as well as the site of Amri. These findings were later confirmed by the borings undertaken by Dale and his team during 1965, as mentioned above.

Complicating the stratigraphic picture is the occurrence of the Harappan artifacts at a depth of 12 meters below the present ground level. This is an extraordinary thick occupation and does not correspond with the few carbon dates available. An interesting argument has been offered to explain this anomaly. This explanation is based on the fact that the two mounds of the site were both built on huge man-made platforms of mud and mud-brick. To get clay for these bricks, the builders of Mohenjo-daro must have dug in the immediate area, and thus created a wide and deep ditch around it. As people living in houses built on the top of the two platforms threw rubbish in this ditch, artifacts would be found at a much lower depth than the level of the actual occupation. It is an interesting hypothesis but certainly not beyond doubt.

In summary, the statigraphy and the internal chronology of Mohenjo-daro is not yet clear and doubts exist even on the chronology of the upper most levels. Only two radiocarbon dates have been

processed from the mixed later levels of the site
The drains along the main roads could be covered, and sometimes had man-high, cor
and these indicate that the final occupation in the
belled, burnt-brick roofing, to enable cleaners to enter them But all the drains ultimately ended in soak-pits within the city by the roadside, and might well have overflowed from
HR area of the site occurred between 2200-1900
time to time. Despite such limitations, the drainage system of Mohenjodaro stands

BC. However, the Late Harappan occupation may unique among the Bronze Age cities of the world. have continued slightly longer in other areas of the A meticulous attention to the supply of fresh water, the disposal of used water and an

site, since this period is dated to 1700 on the basis

extraordinary generous use of water for personal hygiene is evident at Mohenjodaro to of excavations in other regions of the Indus valley.
such an extent that one can call it an obsession. Jansen calls it **Deterioration of the**

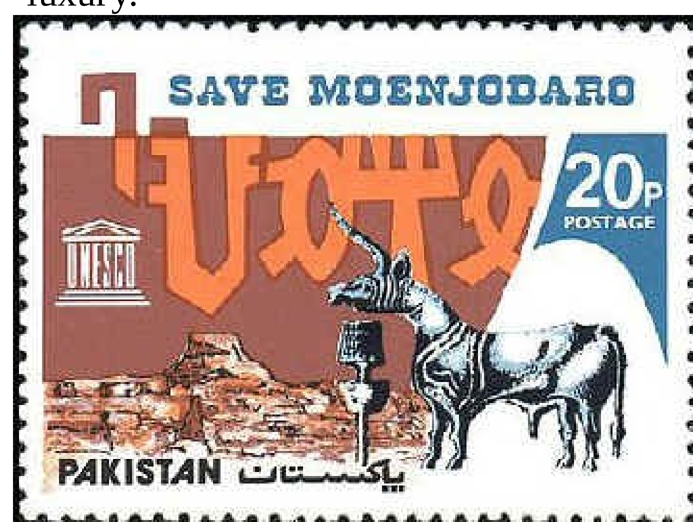
Site: At the time of the **Deterioration of the Site:** At the time of the
excavations in 1922 the

excavations in 1922 the structural remains were in an structural remains wereexcellent condition. For as long as they remained
buried, the remains of Mohenjodaro were preserved,

in an excellent condition.
like a bee in amber, for future generations. In 1933,

For as long as they renot long after the discoveries at Mohenjodaro, Sind
mained buried, the rebegan to be irrigated all the year round from mains of Mohenjo-daro

controlled river water supplies of the Sukkur Barrage, were preserved, like aabout 125 km north of the site. The Dadu Canal on
wasserluxus, that is, water
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the right bank of the Indus has been irrigating the area around Mohenjodaro ever since
bee in amber, for future

and flows not more than 4 km to the west, whereas the Indus River itself is about 1 km generations. In 1933, not long after the discoveries to the east of the archaeological remains. The Indus feeds the groundwater reservoir

during periods of flood whereas the Dadu Canal, in combination with the lands irrigated year round from controlled river water supplies ofby it, contributes to the rise in groundwater levels year

around. As a result, the water table around Mohenjodaro has been continually rising. In 1922 it was reported to be

the Sukkur Barrage, about 125 km north of the site.

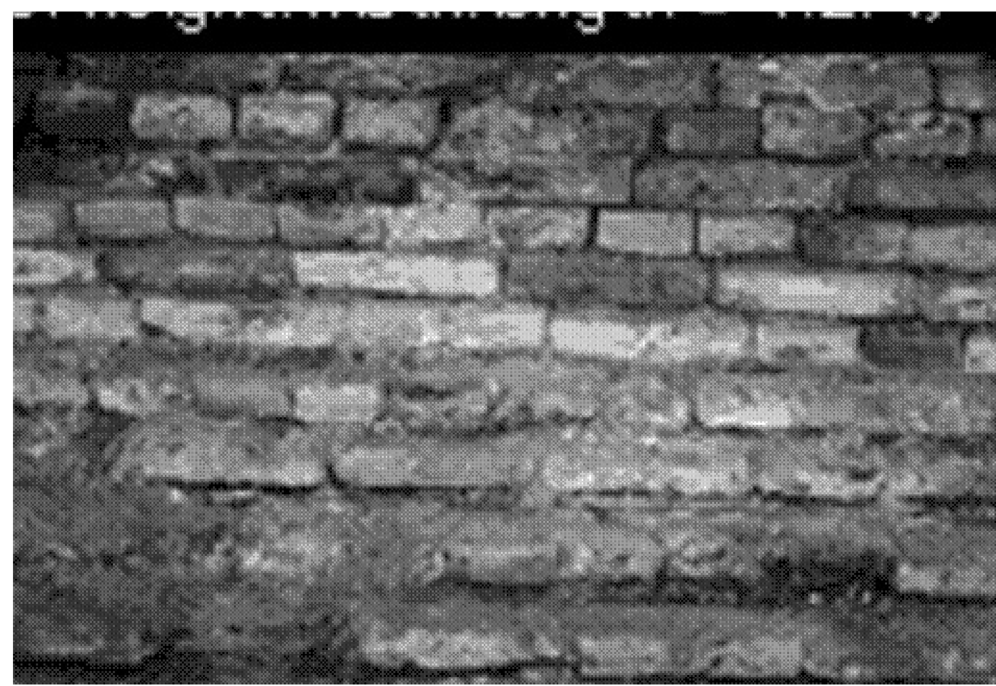
nearly 8 m below normal ground level; the present level fluctuates between 1.52 m in The Dadu Canal on the right bank of the Indus has October and 3.66 m in May every year.
been irrigating the area around Mohenjo-daro ever Groundwater always contains some salts, and the transportation of these salts associated

since and flows not more than 4 km to the west, with the rise in the water table constitutes a serious threat to the structural remains of
whereas the Indus River itself is about 1 km to the

Mohenjodaro. The salts travel with the water rising through capillary action. While moisture evaporates, the salts are left on theeast of the archaeological remains. The Indus feeds the groundwater reservoir during periods of flood

this region. i.e. high evaporation and low rainfall,
whereas the Dadu Canal, in combination with the
the evaporation of moisture causes a progressive to the rise in concentration of soluble salts, particularly at the
groundwater levels year around. As a result, the
base of the buildings. The action of these soluble
water table around Mohenjo-daro has been con
causes weathering and disintegration of thetinually rising. In 1922 it was reported to be nearly 8materials. Both physio-chemical and physical m below normal ground level; the present level fluc processes play their role in this disintegration. The
tuates between 1.52 m in October and 3.66 m in
chemical action between the salts and the building

May every year. material leads to weakening of the material. In the
process, heavy pressures are exerted on the sides of
the pores which break up the surface of the bricks.



The bricks at Mohenjodaro are being pulverized by the action of salt seeping up from the sub-soil water

with the rise in the water table constitutes a serious threat to the structural remains of Mohenjodaro. The salts travel with the water rising through capillary action. While
moisture evaporates, the salts are left on the Groundwater always contains some salts,
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the rise in the water table constitutes a serious

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the evaporation of moisture causes a progressive

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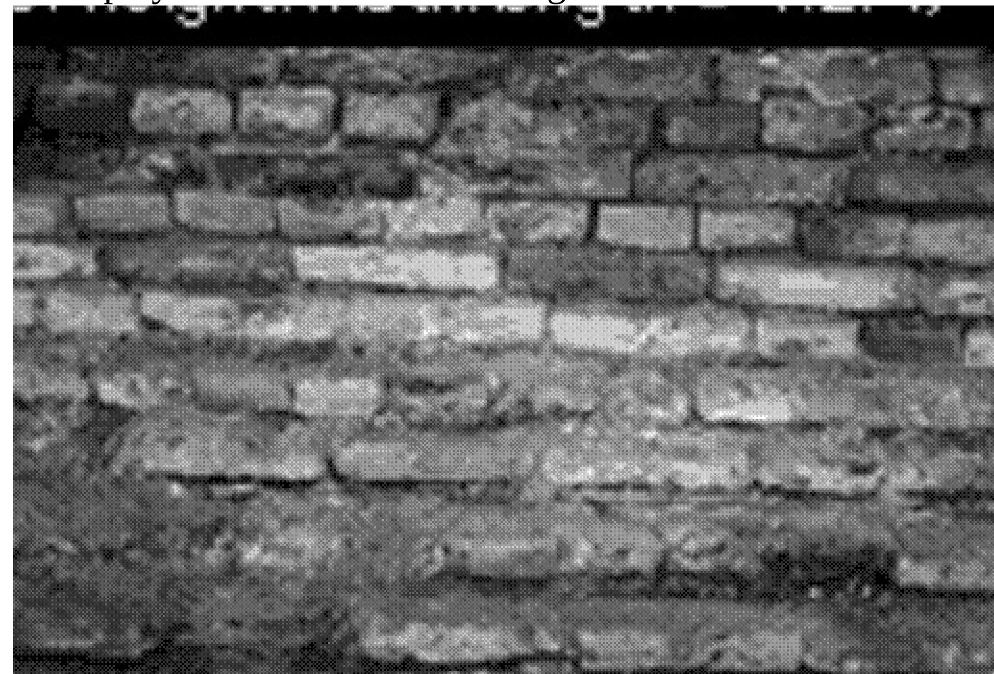
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Both physio-chemical physical terials causes weathering and disintegration of theand
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esses play their role in this disintegration. The



chemical action between the salts and the buildingchemical action between the salts and the building Mohenjodaro and Southern Cities!
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process, heavy pressures are exerted on the sides of

of the pores which break up the surface of the crystallization is created,

The bricks at Mohenjodaro are being pulverized by the action of salt seeping up from the sub-soil water

the pores which break up the surface of the bricks.

Over the past fifty years the twin menace of
water- logging and salinity has reached alarming
to exfoliate and crumble
into dust.

proportions, and today threatens the very existence Page 191
of the remains of this remarkable civilization. TheOver the past fifty years
alarming pace of the deterioration was dramatically the twin menace of water
expressed by Dr H. J. Plenderleith who came tohas
Pakistan in 1964 as head of a UNESCO mission.alarming
His assessment was: 'If nothing is done to preservetoday
it, all the existing excavations will crumble within thevery
next 20 to 30 years and one of the most strikingexistence of the remains of
monuments of the dawn of civilization will be lost for this remarkable
ever.' (8) civilization. The alarming

Coupled with the problem of the rising waterpace of the deterioration
table is the less persistent but more erratic behavior dramatically
of the River Indus in the vicinity of Mohenjo-daro. Itexpressed by Dr H. J.
threatens to wash it away in one of those disastrous Plenderleith who came to
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ravages of this mighty river, caused by its ever shiftof a UNESCO mission.
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Even the destruction of Mohenjo-daro has beennothing is done to preserve
attributed to it by certain archaeologists. In 1960,existing
the Government of Pakistan entered into negotiaexcavations will crumble
tions with UNESCO, and as a result a number ofwithin the next 20 to 30
individual experts and missions of experts visitedyears and one of the most
Pakistan to study the situation and suggest remestriking monuments of the
dial measures. This coming and going of foreigndawn of civilization will
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River Indus in the vicinity

the menace of corruption in the governmental cirItcles which is equally devastating in its scope. Sevof Mohenjodaro.
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tional efforts to stem off this plunder seem to be

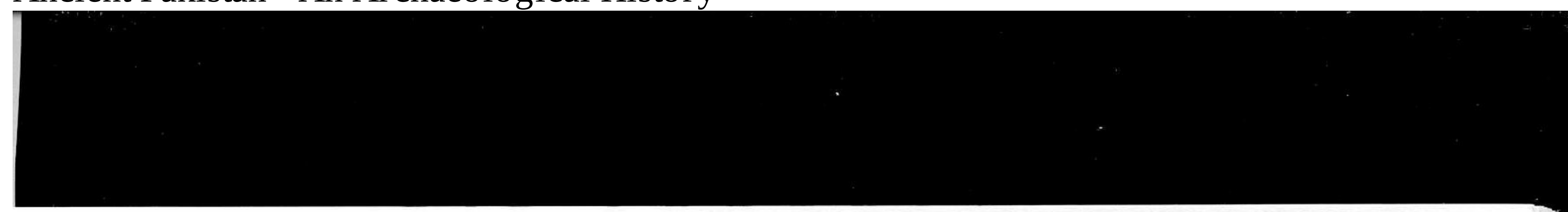






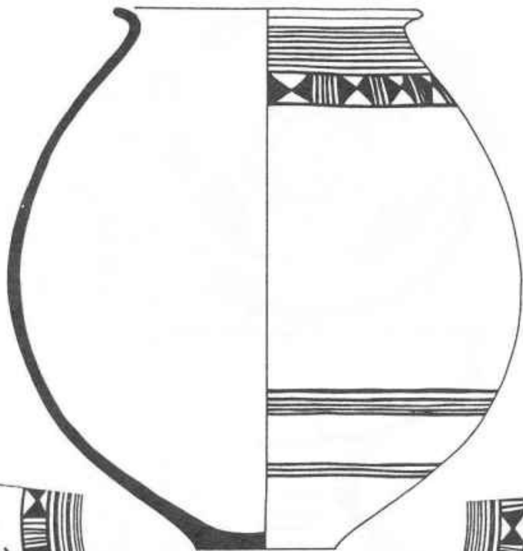
Walls are crumbling under the impact of seeping salt from the soil below

Walls are crumbling under the impact of seeping salt from the soil below Page 192
Ancient Pakistan - An Archaeological History



having rather limited success so far because of a Harappan Civilization - The Material Culture
thriving business in antiquities exists all over the *Characteristics of the Pre-Harappan Remains, Pottery, and Artifacts at Nausharo **249***
globe. This robbing off national treasure is no less
of corruption in the governmental circles which
time only three miles distant.
pected to be existing as knock offs instead of the real
TheNausharoexcavationrevealeda
things. International efforts to stem off this plunder
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Mehrgarh one between 3000 and 2500 BC and ancause of a thriving business in antiquities exists all over

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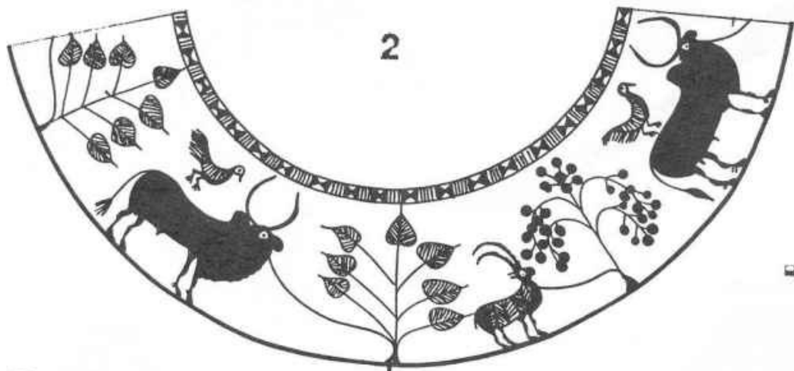




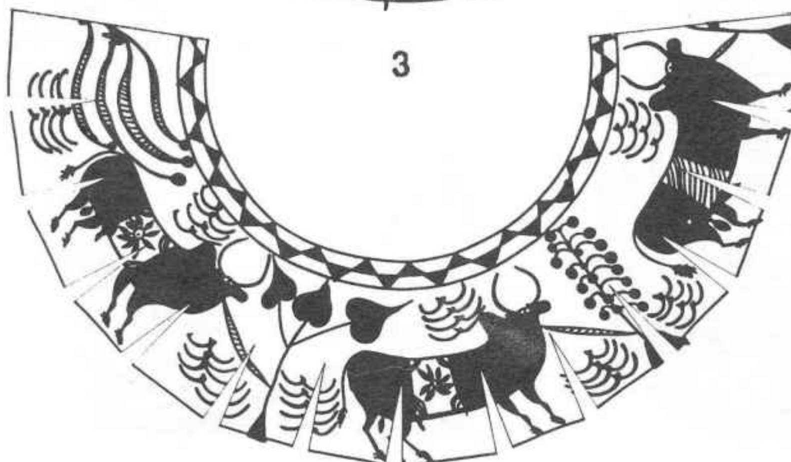
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injurious to the remains of Mohenjo-dareo as thethis mighty river, caused by its ever shifting course, are well-known from time immemorial. Even the destruction menace of water-logging of the surrounding soil.
of Mohenjo-daro has been attributed to it by certain archaeologists. In 1960, the Government of Pakistan en
OTHER CITIES AND TOWNS
tered into negotiations with UNESCO, and as a result a
number of individual experts and missions of experts **Nausharo:**
Located in Balochistan, about 10
visited Pakistan to study the situation and suggest re
miles from Mehrgarh, on the border of Sindh with
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Baluchistan, Nausharo is a well-known archaeologi
perts has so far yielded no practical solution and what
cal site of the Harappan period. The excavations ever money is sanctioned for preservation generally gets lost in petty corruption or gets consumed in sala
were carried out between 1985 and 1996 by a ries of the personnel. French team of archaeologists, under the direction
Apart from the above mentioned situation created
of Jean-François Jarrige. The Pre-urban period at
by nature and exasperated by man, there is the menace Nausharo was contemporary with the latest occupa is tions at Mehrgarh. While Mehrgarh was abandoned equally devastating in its scope. Several great treasures
just before full-scale urbanization on the Indus plain,
of antiquity are known to have been stolen from the

Nausharo continued to be inhabited. At present the museums with the full connivance of the high governIndus flows some twelve miles west of the mounds but, as an ancient river bed shows, it was at oneerals, and, some say, even by the chief executives of

the country. A large number of other artifacts are sus

injurious to the remains of Mohenjo-dareo as the men
the Indus Valley. The excavations at Nausharo are
ace of water-logging of the surrounding soil.

important as they allow the Harappan Civilization to be linked to the Early Indus cultures. The excavation of the Harappan layers led to the uncovering of

Nausharo: Located in Balochistan, about 10a culture that meets the criteria of the urban phase miles from Mehrgarh, on the border of Sindh with Balu

of the Indus Civilization. Architectural elements at chistan, Nausharo is a well-known archaeological site of
Nausharo are typical of the Indus style and though the Harappan period. The excavations were carried out

every aspect of the settlement suggests continuity
between 1985 and 1996 by a French team of archae
with Pre-urban levels, there is an influx of new ideas
ologists, under the direction of Jean-François Jarrige.
and material culture from the Indus superimposed
The Pre-urban period at Nausharo was contemporary
upon it. Large walls and platforms of mudbrick,While
Mehrgarh was abandoned just before full-scale urbani
baked brick drains, streets, and lanes oriented to an
zation on the Indus plain, Nausharo continued to be
east-west and north-south grid show evidence of
inhabited. At present the Indus flows some twelve miles
town planning. There also was uniformity in con

west of the mounds but, as an ancient river bed shows, struction and plans of housing units. The excavator
it was at one time only three miles distant.
of one of the blocks at Nausharo, Catherine Jarrige, The Nausharo excavation revealed a dwelling

has described the houses as follows:site contemporaneous and identical to the Mehrgarh
“They all show a large central space [a court

one between 3000 and 2500 BC and another, divided yard], most probably open, sometimes partly covinto three periods between 2500 and 1900 BC, characered by a shelter on one side, as indicated by pillars

excavations at Nausharo are important as they allow
of postholes, and two or three small compartments
the Harappan Civilization to be linked to the Early Indus
probably covered by a roof. .. [There is] ... a direct
cultures. The excavation of the Harappan layers led to
correlation between the size of the house and that of
the uncovering of a culture that meets the criteria of the the courtyard” (18). Of particular interest

aturban phase of the Indus Civilization. Architectural ele
Nausharo is an apparently abruptly abandoned pot





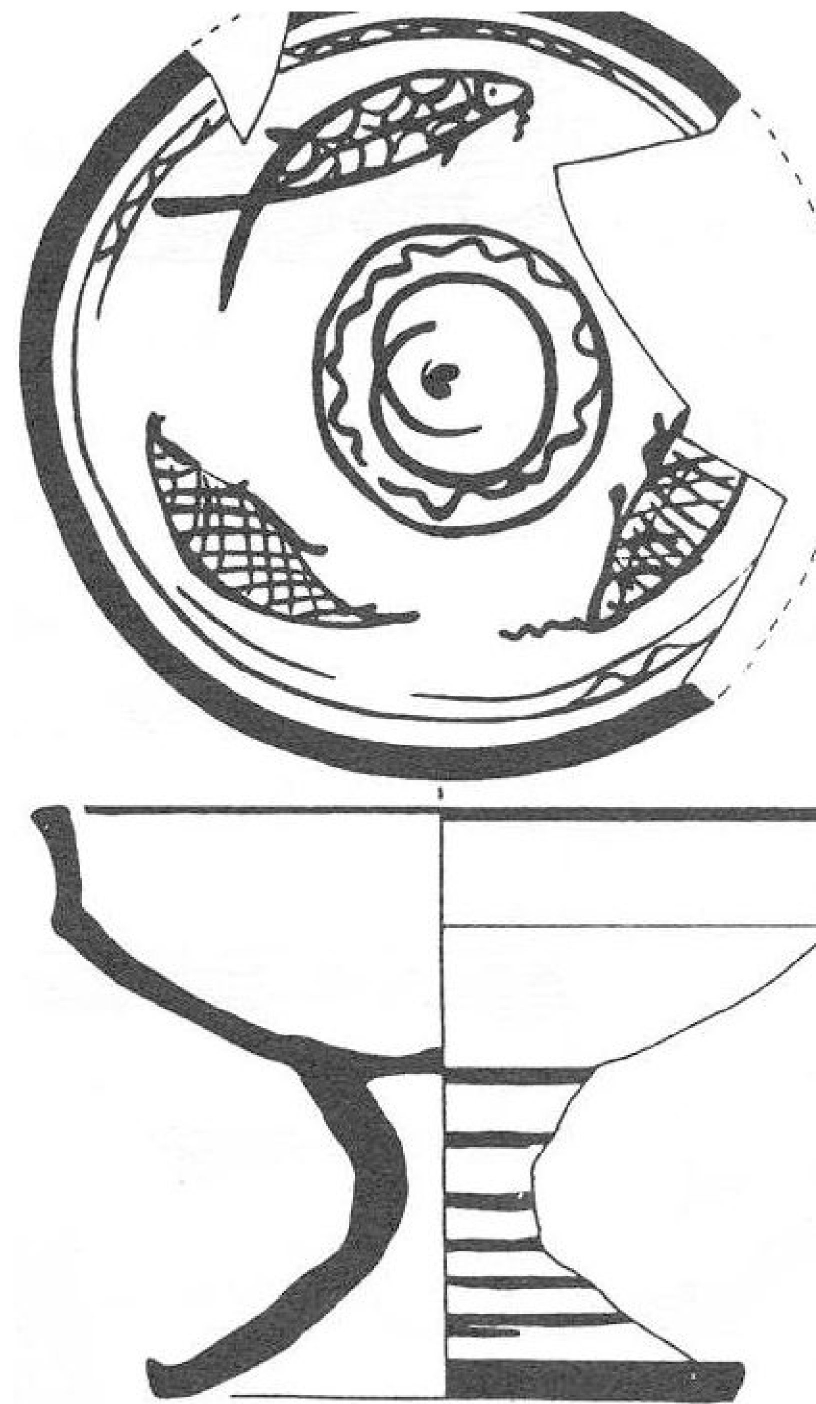
ments at Nausharo are typical of the Indus style and
tery workshop with its nearly an entirely complete
though every aspect of the settlement suggests continu
pottery tool kit, including chipped stone blades, kiln
ity with Pre-urban levels, there is an influx of new ideas
wasters and unfinished pottery. The workshop dates to about 2500 BC, the first Indus phase. At leastit.
Large walls and platforms of mudbrick, baked brick
drains, streets, and lanes oriented to an east-west and
four rooms of the settlement at Nausharo were
north-south grid show evidence of town planning. There

dedicated to pottery manufacture, although other deposits of kilns and related artifacts were found elsewhere. The workshop tools included 12 flint[160] blades or blade fragments, a bone tool, a terra cotta tool, a large clay coil shaped in a ring, a piece of red

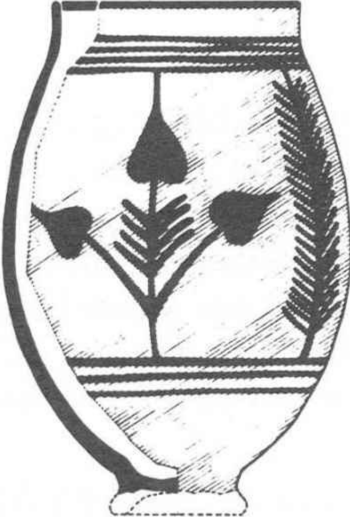


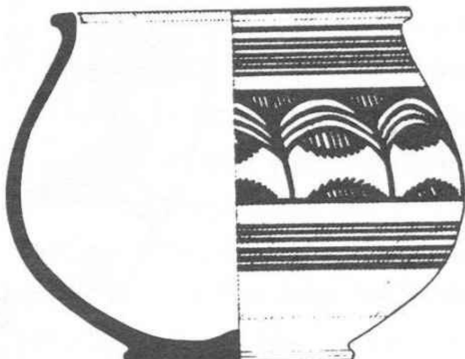
Pottery decoration Nausharo **Pottery decoration Nausharo**

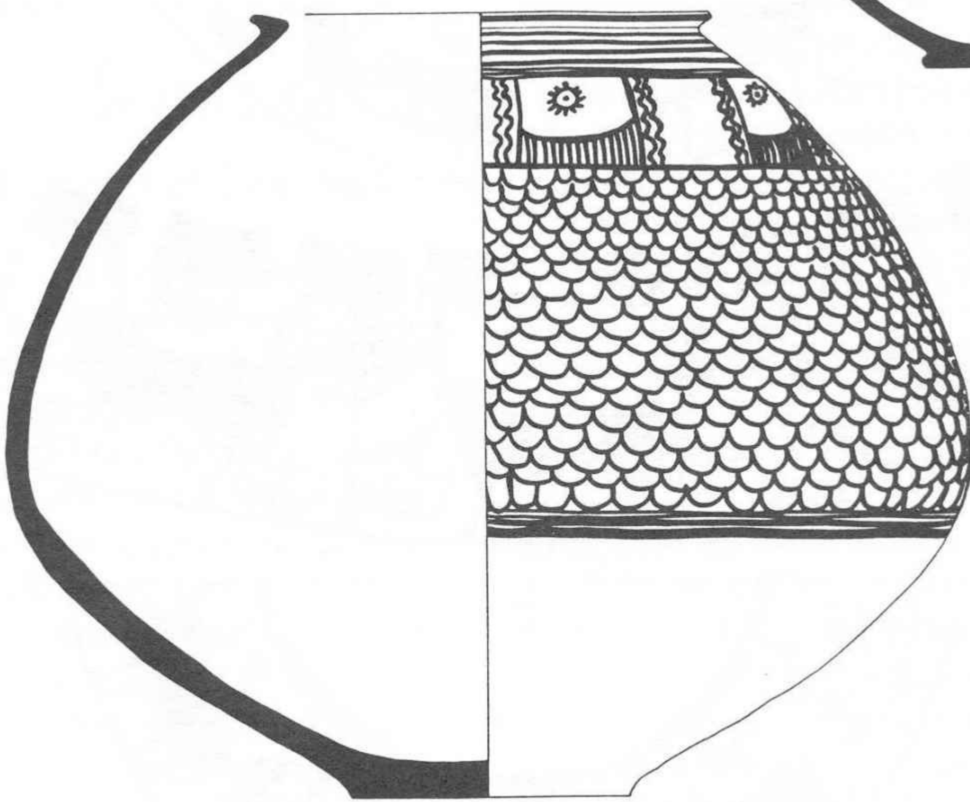
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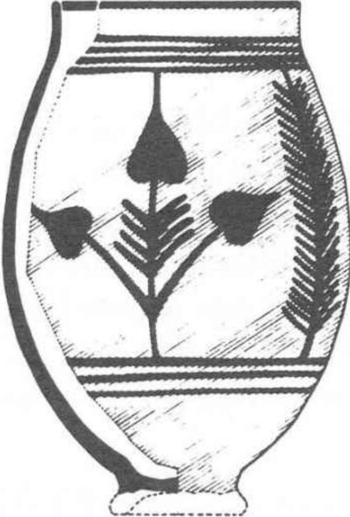
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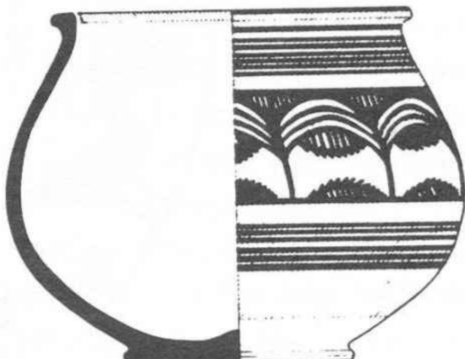


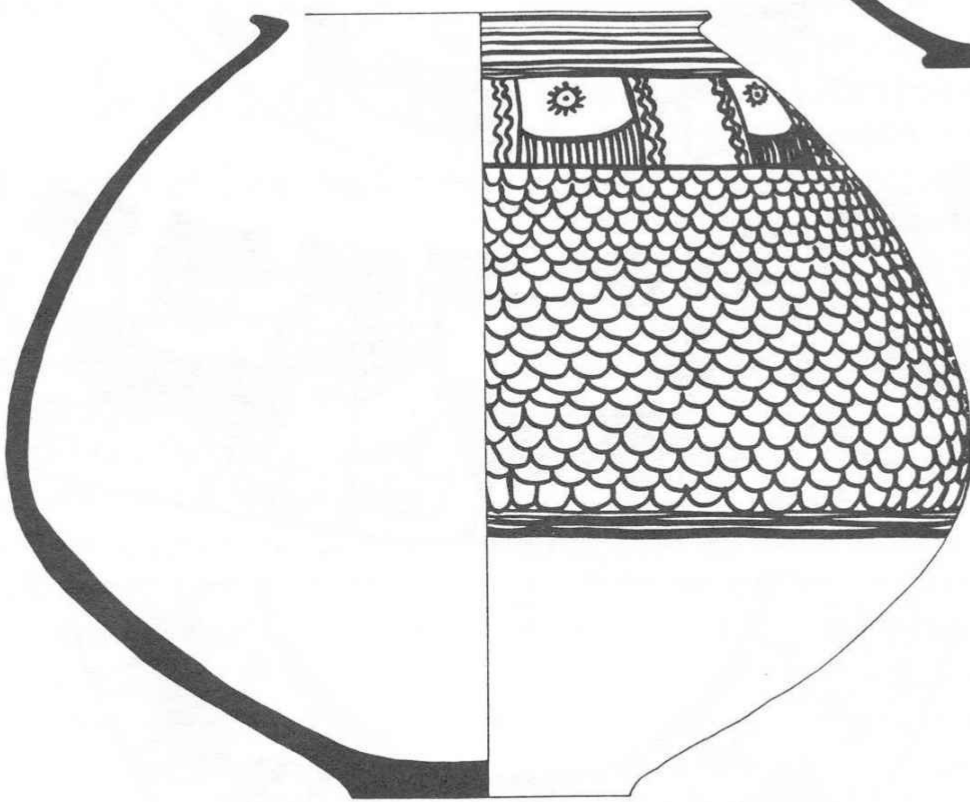




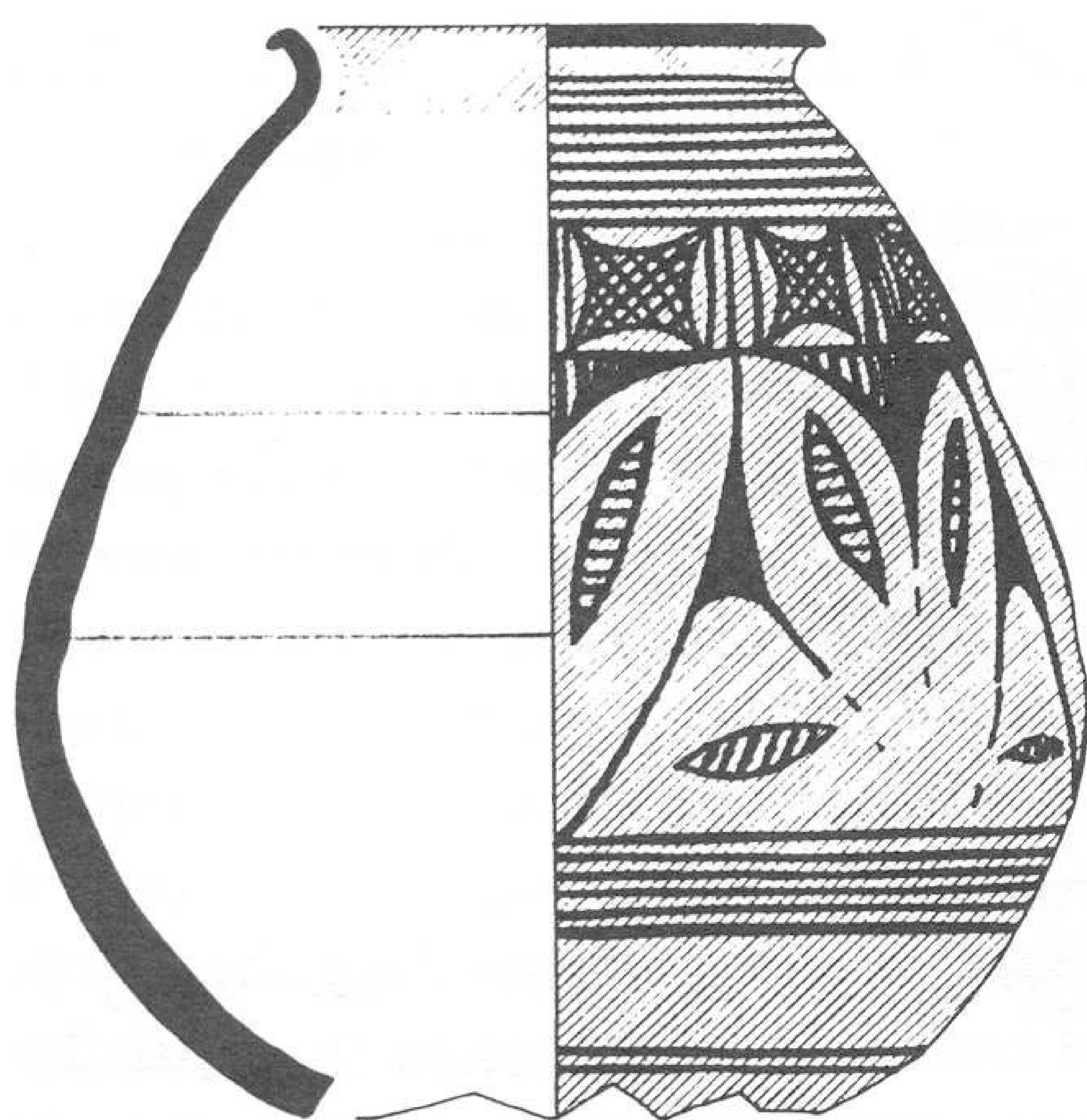
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Figure 29.4. Other types of pottery recovered in Structure 4
o .""



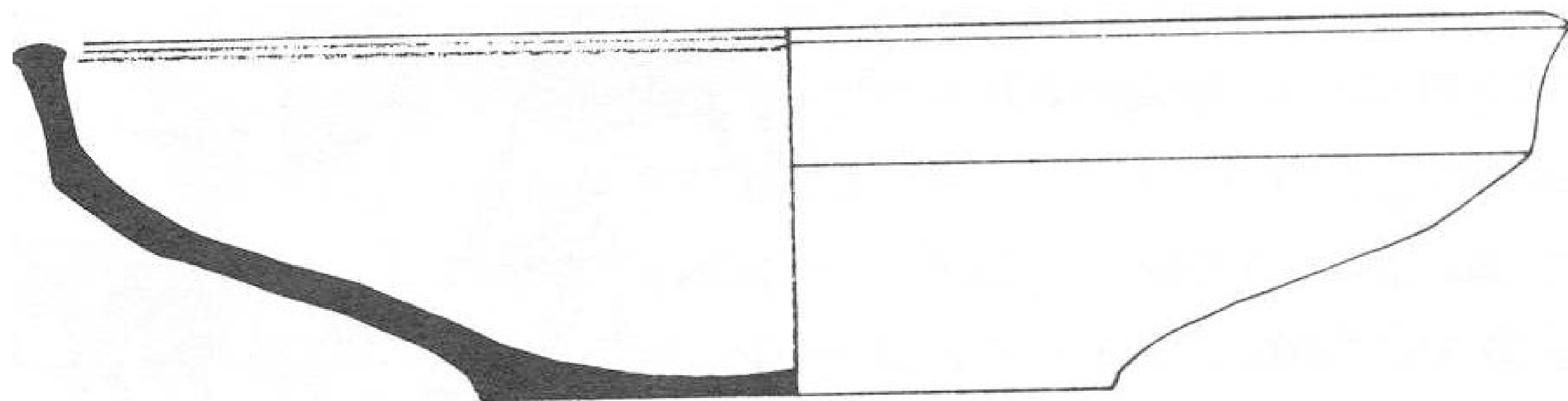
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Figure 29.3. Pottery found in Structure II: decorations and shape. Jars nos. 1 and 2: Locus 4 ; Jar no. 3: Locus 2; Jar no. 4: Locus 14.

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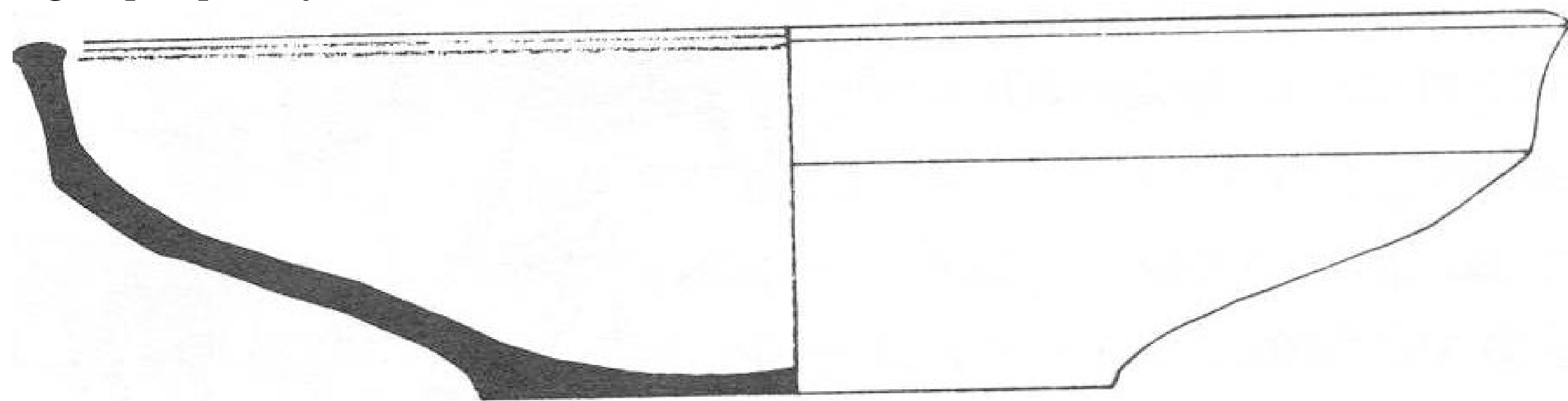
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II: no. 2: Locus 3; nos. 1,4,5, and 7: Locus 4; no. 3, 6: Locus 14.

A group of pottery from Nausharo



5 7

Figure 29.4. Other types of pottery recovered in Structure II: no. 2: Locus 3; nos. 1,4,5, and 7: Locus 4; no. 3, 6: Locus 14.

A group of pottery from Nausharo

ochre, some raw clay, clay shavings, and two a group of three low mounds that excavation has grinding stones. Additional evidence included baked shown were parts of a single settlement estimated clay receptacles, kilns, saggars, and jar base to have been approximately 5 hectares in size, molds.The remains of approximately 25 broken unabout the same size as Lothal. The settlement was fired clay vessels of various shapes were also dislocated about 5 kilometers from the left bank of the covered. All but one were unpainted. Most of the Indus River. It is believed that there may have been pedestalled dishes, perforated jars and large bowls

were made of the same clay, a fine-grained sandy marl, and most of the vessels found throughout Nausharo were of the same material, between 2700-2300 BC. Of interest are evidence of a possi ble water-storage tank with a baked brick spillway and a few drains. But the excavators have noted that drains do not occur in the same profusion and regularity as at Mohenjo-daro.

Nausharo is primarily an Early Indus or a transitional settlement, it sequences from the later Early Harappan stage to two phases of the Mature





A terracotta toy cart from Harappan period of Naushahro. Holes along the length of the cart serve to hold wooden side bars and at the center of the cart two of the wooden side bars can be

extended below the frame to hold the axle. A long stick inserted into the holes at the end of the cart would have been used to support a yoke. The two wheels were found lying next to the cart frame. Period III, Harappan, 2300-2200 B. C. Similar carts are still used in rural areas of Pakistan (see picture below)

Cooking pots from Nausharo, ca. 2200-2300 BC

Harappan (with eight meters of deposit in one sec tion), and then a level with post-Harappan remains. Like Kot Diji and Amri, the site of Nausharo is im portant in connecting the Early Indus cultures to the Mature Harappan Civilization through its 'transi tional' material remains.

Chanhu-daro: Chanhu-daro is another city or town of the Indus Civilization in Sindh. Today it is





A traditional bullock cart like this is still used for local transport along the Indus River in Pakistan. Observe the similarity with the toycart from Nausharo, depicted in the

Painted storage jars from Nausharo, ca. 2500 BC picture on top.

a pre-Indus settlement at the site but all evidence regarding this settlement has been destroyed by the rising water table. Chanhu-daro was destroyed several times by floods before the mound was raised to a sufficient height to make the settlement safe against the most severe flooding.

Chanhudaro was excavated by Majumdar in March 1930 and again during the winter field season of 1935-1936 by Mackay. The latter's excavations show that the Harappan occupation of Chanhu-daro was followed by Jhukar (a post-urban culture) and Jhangar (a late bronze age period); the Harappan period itself consisting of four levels of occupation.

The remains belonging to the Indus Civilization at Chanhudaro indicate that this industrial town was constructed and maintained on the pattern of other major Indus settlements. The major streets were about 10 meters wide and the layout of the streets and lanes was in a grid pattern. The whole town was planned exclusively for industrial activity. Different sectors in the town were reserved for making seals, copper and bronze tools and implements, beads of different materials and ceramics items. In each sector proper arrangements were made for


A reconstructed Terracotta model of an oxen cart from Chanhudaro, ca. 2500 BC (Brooklyn Museum)

disposal of wastewater through drains that were lined with baked bricks. The use of sun-dried bricks were common but baked brick was used for lining wells and drains.

In general appearance, Chanhu-daro could have been an ordinary quarter of Mohenjodaro: planned, with the streets provided with drains of fired brick, and houses consisting of rooms around courtyards with privies and bathrooms.The outside walls of houses, at least on one side of the house, bordered streets or lanes. There were drains in houses that spilled out into streets with wellconstructed baked brick drains. Some houses also had bathing rooms with paved floors, either of fired bricks, reused stone or pottery shards. In some in



Painted jar from Chanhudaro, ca. 2000 BC. Peacock and intersecting circles were a common design motifs throughout the Harappan Civilization.


Fragment of a medium sized pot from Chanhudaro, ca, 2500 BC (Brooklyn Museum)

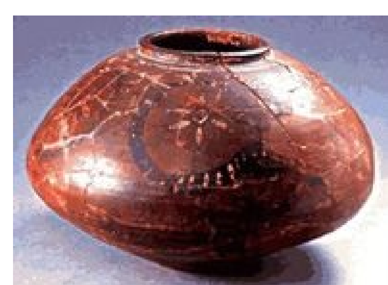
stances, large jar types typical of Indus settlements served as soak pits for refuse.

Of considerable interest is a 'bead factory' with flues and furnace, manufacturing steatite beads. The center piece of the installation was a furnace that was used in several ways, including the glazing of steatite, providing heat to bring out the red color of carnelian, and preparing stone for better chipping, also a part of the bead-making process. There are two copper-bronze toy vehicles from Chanhu-daro. The human figurines are very much like those at Mohenjodaro; however, the very elaborate females are not present. One interesting male figurine has a very close parallel from Nippur. Chanhu-daro seems to have a larger number of bird figurines than other Mature Harappan sites. Perhaps the most interesting figurines are the bulls with single horns, true unicorns**.**

It is believed that during Mature Harappan period, Chanhu-daro seems to have been a regional craft center for the Harappans. This is seen in the bead- and seal-making area and was also confirmed by intensive surface exploration that found concentrations of pottery wasters, debris from the making of chalcedony/carnelian beads, faience work, and shell working. These are much the same kinds of materials and craft activities that are found at other Harappan locations, and one would suspect that there was an intimate connection between this and other sites during the period of the Harappan

Civilization.

KotDiji: "Fort of the Daughter," or Kot Diji, is located high on the southern end of the Rohri Hills. It is an imposing fortress of the Talpur Dynasty. On the plain below is the prehistoric mound of the same name. The location is a strategic one, given the junction of the Indus with the massif of the Rohri Hills. The Pakistan Department of Archaeology excavated at Kot Diji in 1955 and 1957. The site has two parts: Area A, on the mound itself, some 12 meters high; and Area B, the Lower Town. Both places have a stratigraphic succession from Early Harappan to Mature Harappan. The Early Harappan is the


A typical Kot Diji vessel, depicting painted buffalo horns

distinctive Kot Dijian type, defined through these excavations. There may be a fortification assocated with this period. The end of the Kot Dijian occupation is coincident with signs of massive burning. It is followed by the Harappan occupation. There may be a Transitional Stage occupation between them. A well-known pot, with a buffalo motif that seems to figure in the Indus mythological seal is probably attributable to the Early Harappan - Mature Harappan Transition at Kot Diji.

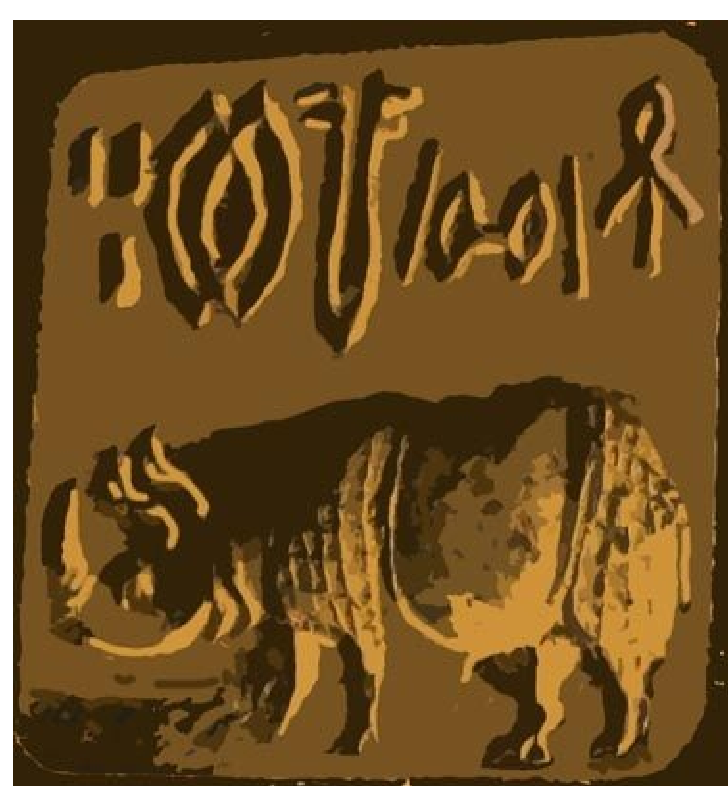
The Harappan occupation held evidence for copper-bronze objects, including a fine example of an Harappan flat axe, bangles, arrowheads, and two chisels. An etched carnelian bead also surfaced. Terra-cotta antiquities were numerous: bangles, cart frames and wheels, model plows, styli, beads of several types, cones, and triangular cakes. Faience disk beads also occurred. The figurines include bulls, humped and unhumped, and birds, painted and plain. Terra-cotta human figurines, which seem to conform to examples from Mohenjodaro and Chanhu-daro, are also present. The absence of lapis lazuli, turquoise, and other luxury raw materials is noteworthy. There is no report on either plant or animal remains at Kot Diji.

Coastal Towns: Quite a few coastal sites are known in Pakistan, of which four are important: Sutkagen-dor on the Pakistan-Iran border, Sotkha Koh about halfway along the Makran coast above Pasni, Balakot on the eastern side of Sonmiani Bay, and Allahdino in the eastern outskirts of Karachi. All of these sites have been studied extensively but individually without an attempt of finding any possible connection between them or detecting a common thread running through them. As a group, these sites are spread over a large area and radically differ from coastal towns and villages in Kutch and Sautrashtra: the former group looks to the West while the latter is largely inward looking. The Harappan element is, however, strong in both of these groups: the former relating more to the early period of the Harappan Civilization, the latter group clearly a reflection of the civilization’s old age. Allahdino, Balakot, Sotkha Koh, and Sutkagen Dor were settled during the mature phase of the Harappan period. They were built by Harappans, for Harappans, to support Harappan commercial and economic interests. The exploitation of marine resources would have been a logical concomitant to their seafaring activities.

Allahdino: A large number of Harappan sites , some really small and some relatively large, are

situated between the Hub River in Lasbela and the Malir River near Karachi. Allahdino is one of them, located at the banks of the Malir. This river system drains an area in the Kohistan of considerable magnitude and in consequence the catch basin is responsible for an extraordinary quantity of underground water. Pumping of this water provides irrigation water for the Damlotti and Malir agricultural developments or for watering the lawns of the Malir sprawl of Karachi. The Malir River in flood season is a formidable stream and capable of regularly filling local reservoirs.

Allhahdino was first excavated in 1973 by Walter A. Fairservis. It is situated today in a desert outside both the fertile flood plain and away from the better watered upland borderlands and requires modern pump irrigation for agriculture. As noted by Hoffman and Shaffer (19), it is located in an ecological "tension zone" especially sensitive to the cyclical vagaries of the micro-climate. Slightly more salubrious micro-climatic conditions in antiquity might have encouraged the short time occupation the excavations have revealed. Its 4.5 meters of stratified occupational remains represent three main architectural phases, all of which are described as Mature Harappan. The site of Allahdino is somewhat unique: it does not appear to have been a town in the usual sense. Rather it may have been the domicile of a wealthy merchant or land-owner who preferred the rural to the urban life. The artifacts discovered are surprisingly rich for such a small isolated site. At least nine Harappan inscribed stone seals, a horde of gold and semi-precious stone jewelry, and hundreds of examples of copper suggest a close socio-economic link with the major Indus sites.


A Harappan seal from Allahdino

Fairservis (20) has made a few interesting observations based on his survey of the area and limited excavations. He found at the central, highest part of the site, an open court measuring 20 by 8 meters. Access to the central court was made possible through open passageways left between the surrounding buildings. Several buildings surround the court, each building having a complex of small rooms. In one of these rooms a small pot was found *in situ* which contained a jewelry cache of five necklaces and eleven copper finger rings of coiled wire. The necklaces had silver beads as well as carnelian, agate, jasper and copper beads and spacers. A tiny gold earring was also found in this cache.

Fairservis found two wells at the central part of the excavated site. Both wells had small opening (60 by 90 centimeters). This smallness of opening is rather intriguing and so is the mode of their construction. No bricks were used, as is generally found in the well constructions of Mohenjo-daro. Instead stone was here the material of construction. One of the wells was traced to a depth of about 1-2 meters into the virgin soil before the stone construction stopped. This is a peculiar construction, to say the least.

It is well-known that the water in wells rises higher than the surroundings water table because of hydrostatic pressure. The smaller the well diameter the higher the water will rise. Modern wells in the Damlotti area fluctuate in water height as much as 10 meters or more. It is suggested then that the wells were deliberately kept small in diameter so that the water level would not only rise higher but would indeed overflow in artesian fashion. The well openings are certainly too small to conveniently lower containers through them. The central well is located at the highest part of the site. Any runoff from the well could be channeled wherever one wished because of the slope of the surrounding. If the wells at Allahdino worked in an artesian fashion, then they must be functional only a part time of the year when the water table of the surrounding was high and the Malir River furnished enough water to the reservoir as to keep the hydrostatic pressure sufficient for the overflow of the wells.

There is evidence for cattle, goats and sheep, the water buffalo, possibly the donkey. There is the evidence of fish and fowl as well. Wheat and barley are attested and a legume of some unidentifiable kind was found. The seals and graffiti attested to the fact that not only was the Harappan script well known to the inhabitants of Allahdino, but the social organization for which the seals are representative was in vogue there. It is clear that the Allahdino settlement was highly organized under a leadership familiar on a larger scale at Mohenjo-daro and elsewhere.

It seems that Allahdino was a settlement created to serve a community whose population was residents in households scattered over the scale and presumed to be largely engaged in agriculture and pastoralism. The settlement most likely provided various functions, including local administration, manufacture of clay artifacts and a place of local trade and exchange. In these respects, it very much resembles with a present-day small Hub Valley town, with a mosque, a reliable source of water, a tea shop, and the residence of the *Wadera*, the local tribal chief, and serving several small *goaths* (small settlements of only a few households) around it.

Other data shedding light on the Mature Harappan culture are emerging from the Allahdino excavations. All major categories of Harappan material culture, except anthropomorphic figurines, have been located in quantity at this small site. This includes semiprecious stones and precious metals. Structures at Allahdino are oriented to the cardinal direct including drains, wells and bathrooms are found. One large structure with a mud-brick platform at one end and a deep well at the other may represent some type of public place, separated by streets, and are functionally distinct (although at present one is unable to make specific functional designations).

Absence of any indication of local manufacture for most objects of material culture found at the site indicates that the inhabitants of Allahdino had access to, and participated in, the extensive Harappan internal trading noted elsewhere in this book. Yet another significant aspect of Allahdino was the location of several seals, one sealing, and several examples of Harappan script incised and painted on potsherds. These examples of Harappan script located at Allahdino suggest that literacy was present in a small site context and may have played an important part in daily activities there. The point to note

is that qualitatively there is little difference between Allahdino and the large urban centers of the Mature Harappan culture such as Mohenjo-daro. All the essential characteristics of the urban center are duplicated at this smaller site, including literacy. It would appear from the available data (albeit it is Iimited) that there was no sharp cultural dichotomy separating the large urban centers and smaller, presumably rural, settlements.

What possible function could this small site have served? We cannot make the same claim to involvement in coastal shipping activities that can be made for Sutkagen Dor, Sotkha Koh and perhaps even Balakot (see below). The preliminary reports by Hoffman and Shaffer (21) suggest something quite different, and if correct, important for our meager understanding of Harappan evolution and socio-economic structures in the south. They note that although the ceramic and artifactual deposits represent continuous occupation with no indication of abandonment, there was "a major material culture discontinuity." The lowest two occupation levels have a lithic assemblage that consists basically of flint flakes and microlithic lunates instead of the long parallel-sided blades characteristic of "mature" Harappan. Also, they found no trace of permanent mud brick structures in the lowest levels. This suggests to Hoffman and Shaffer a major shift in the basic economic function of the site from an original phase of pastoral nomadism to the permanent settlement that dominates the latest occupation. It is important to note that this transition took place apparently within a cultural and chronological context that is otherwise clearly mature Harappan. It seems then that the original settlers at Allahdino were pastoral nomads who were an active demographic part of the Harappan culture. For reasons unknown, they
- or other Hardpans - finally established a sedentary agricultural community with formal mud brick architecture. This presents an entirely different *raison d'être* and function for Allahdino than for any other Harappan coastal site.

Balakot: It is not unreasonable to suggest that the earliest settlement at Balakot (see below) were also basically pastoral nomadic in orientation even though they did construct mud brick houses. Their dietary and exploitational practices suggest this if nothing else. But this does not offer a parallel to the developments at Allahdino because this phase occurred at Balakot in pre-Harappan times rather than during the Harappan occupation.

Balakot lies in the Khurkera alluvial plain near the Sonmiani bay. Dales (22,23) conducted extensive excavation of this site in 1973. He found the Harappan occupation on top of a robust presence of the Early Indus culture, resembling that of south Baluchistan and evidenced at several other places in the region. Although not conclusively proven, Dales also detected a transition phase between the Early Indus and the Harappan occupation. The Harappan level of this site (*ca*. 3 ha) has a higher western mound and a lower eastern one and shows some evidence of lanes and mud-brick houses. The use of burnt bricks has been observed only in some drains. The floor of a room has been found plastered with burnt square tiles bearing impressed intersecting circle designs. A lime-plastered courtyard contains in its center a circular depression

**A goat seal with inscription from Balakot**

with the remains of a wooden column. Wood was used for the threshold of the houses and there is a room (presumably a bathroom) which has yielded a pottery tub with its floor decorated by intersecting circles, a hearth, a buried storage jar, and a drain formed by a broken pot. One ordinary room has been found to measure 2.2 m x 3.2 m. A large Harappan kiln and a few smaller ones were possibly intended for the baking of animal figurines. There is no evidence of an enclosing wall around the settlement. Balakot was briefly abandoned and then reoccupied. In its new levels, it contains typical Indus pottery.

TheBalakotsettlementwasconstructed largely of mud brick. A few seals and chert blades, a profusion of terracotta cakes, and some metal objects are among the finds. There was contact with the neighboring Kulli culture of southern Baluchistan. In Harappan times, but not during its earlier history, there was intensive utilization of sea-shells.

Sutkagen-dor and Sotka Koh: Two strongly fortified Harappan sites were known for some time at Sutkagendor near Gwadar and Sokta Koh near Pasni, some 150 km apart. Surrounded by heavy stone walls both sites required a tremendous effort to be built and supplied. They could have been sea ports but the sea has since receded. Neither of ports but the sea has since receded. Neither of 25 km from the coast. Alternatively, these settlements must have been an important trading centers and strategic outposts for the defense of the trade, guarding important access routes to more densely inhabited riverine oasis of the interior. More than seaports they recall strongholds to separate the interior from the coast.

Sutkagen-dor is the westernmost site of the Indus Civilization and is located in the Dasht Valley of the Makran. It is near the western bank of the Dasht and its confluence with a smaller stream. It was discovered in 1875 by Major E. Mockler, who conducted a small excavation there. As a part of his Gedrosia tour, Stein came here in 1928 and conducted a small excavation. It is somewhat odd that Stein did not immediately recognize the site as belonging to the same culture as was then being revealed by the excavations at Mohenjo-daro and Harappa, but he related it to the Chalcolithic traditions of Baluchistan. Dales was at Sutkagen-dor from October 7 through 20, 1960, as a part of his Makran survey (22,23) and conducted small-scale excavations during this time. The Harappans

constructed enormous walls of semi-dressed stones to enclose a rectangular "citadel" large enough to hold four football fields. There was apparently a lower town just to the east of the "citadel" and possibly a wharf along the northern edge of the settlement.

The stone "citadel" wall is approximately 24 feet thick at the base, had bastions or towers along the western and eastern sides, and a narrow gateway in the southwest corner. Structures within this enclosure were constructed of mud bricks set on stone foundations. Some fired bricks and decorated floor tiles were found. The site measures approximately 300 by 150 meters, or 4.5 hectares. Dale found at Sutkagen-dor and nearby Sotka-koh the enclosure of the upper or higher areas, much as occurs in the citadel at Harappa and Mohenjodaro.

At Sutkagen-dor, Dales recovered a complete copper-bronze disk of the type found at Mehi and probably associated with the Bactria-Margiana Archaeological Complex (BMAC). The pottery is typical Indus red ware in the usual shapes, including the dish-on-stand and black-on-red painted ware. Dales and Lipo note the absence of square stamp seals of Mature Harappan type along with figurines, beads, faience, and clay balls. Otherwise Sutkagendor is more or less a pure Harappan site in the Kulli Domain. There is no Kulli pottery mentioned in the reports on the site.

There was no question about the Harappan attribution of the site. What is in question is why such a large, formal, expensive outpost was established in this desolate region so far from the Indus. It was reachable, in practical terms, only by sea and was isolated from the nearest Harappan site by about 100 miles.

Kulli Sites: In the world of south Asian archaeology, the name Kulli has long held the fascination of those interested in the origins of the Indus Civilization and in the Harappan's contacts with the west. The Kulli folk lived in the hills of southeastern Baluchistan and produced a distinctive style of pottery and figurines which had many elements in common with those of the Harappans at Mohenjodaro. There has always been a question as to the chronological relationship between Kulli and the Harappans and about the cultural and economic relations between them. Recent field research shows almost certainly that Kulli was not preHarappan but was thriving during at least the first part of the mature Indus civilization. Also it appears that they were not simply highland neighbors who acted as intermediaries in trading activities between the Indus and the Near East, as has been suggested by some scholars. Rather, the Kulli folk appear to have been related intimately - economically and culturally - with the Harappans.


A Kulli painted vessel

During his tour of Gedrosia, the Greek name for southern Baluchistan and Makran, Stein uncovered

several prehistoric sites, some of them he briefly excavated. Kargushki Damb, Kulli, Mehi, Nundara, and Nindowari can be specifically mentioned in context with this section. Many of these sites are located in strategic positions, on top of mountains or terrace hills, overlooking the valleys and controlling the plains and passes. Other sites are small hamlets built in the open plain. Although they have no defenses, they are of a very compact appearance. Most sites are associated with dams. The lay-out of some sites resemble the plan of Harappan sites: rows of houses built along lanes and streets, which are sometimes paved. Sometimes, stairs provide access to upper terraces. Building materials were large ashlars or boulders, and the houses are often preserved to a considerable height.

Kullicultureisnormallyassociatedwith Kolwa and the area around Las Bela. It is an attractive area both for its rich agriculture and its position on the route from the coast to Kalat. The Kolwa tract lies to the north-west of Bela and was known for its large quantities of grain, which were exported to its neighboring areas. The main site of Kolwa is Kulli. A second major site of this culture is Mehi which is in the Mushki valley to the north-west of Kolwa. Other important sites are Edith Shar Complex and Niai Buthi. Only the upper levels were exposed both at Kulli and Mehi. The same is true for Edith Shar Complex. Niai Bithi has only recently been excavated.

Kulli (12 ha), the largest mound in Kolwa, very probably represents the principal settlement there. The pottery included storage vessels decorated with raised wavy bands and black-on-red slip, and canister jars decorated with bug like animals identical to those of the latest phase at Mehi. A characteristic feature of the pottery decoration is the the elongated animal form with large and round eyes, shown in framed landscapes. Included are female figurines and painted terracotta bulls. Similar decorative themes have been found at Mehi, Nindowari, and Niai Buthi. Surface clearance showed multiroom stone structures, the blocks of their shale being brought from about 3 km away. Some of these structures were probably used as storage rooms for grain. Within these structures or in the vicinity, Stein found fragments of copper, lapis lazuli beads, bone bangles, a grater, and grinding implements. There were two massive stone querns and their rubbing stones.

Kulli pottery includes many vessel forms identical to those of the Indus Civilization: dishes on stands, "graters," some jars, and large storage vessels. There is also a great deal of purely Mature Harappan plain red ware on these sites. However, the Kulli painting style, especially with the wideeyed animals and fish motifs, is distinctive and has no parallels at Mohenjo-daro or any other Harappan city.

The site of Mehi (10 ha), located in Mushki Valley to the north-west of Kolwa and some forty miles to the southwest of Nal, casts some further light on the nature of the Kulli culture. On the surface, Stein found numerous fragments of both bull and human female clay figurines. The area explored by Stein turned out to be a cemetery in which cremated remains were sometimes buried in vessels or sometimes in the ground. Intimately associated with these burials were copper tools, beads, and terracotta figurines representing women, bulls, and birds.

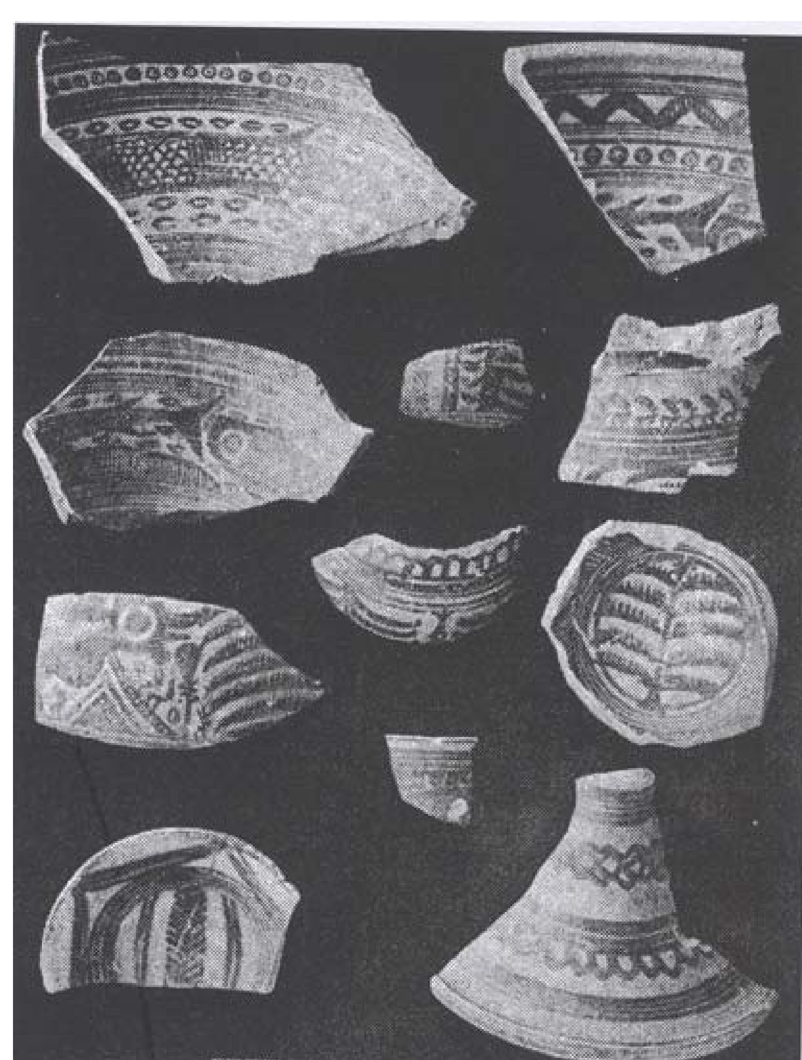
It is of comparative interest that the incinerary urns illustrated by Stein are of the plainer variety. Some were directly comparable in form and decoration to those found at Periano Ghundai. The female

bronze were also found. The copper-bronze examples have good Mohenjodaro. Stein also noted the abundance of worked-shell and a fine onyx bead.

At Sutkagen-dor, Dales recovered a complete copper-bronze disk of the type found at

figurines of Mehi are clearly analogous to those of
Mehi and probably associated with the Bactria-Margiana Archaeological Complex
the Zhob cult. The goggled eyes, necklaces, shoul
(BMAC). The pottery is typical Indus red ware in the usual shapes, including the dish
der form, pedestal bases, hanging hair, and hoods
obviously represent the same basic composition.on-stand and black-on-red painted ware. Dales and Lipo note the absence of square
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Damb Sadaat III in the Quetta Ware. Thus, it ap
pears that the Kulli cities embodied the culturalThere is no Kulli pottery mentioned in the reports on the site. Edith Shar Complex in Leasable. The cultural influ

Kulli Sites ence of southern Iran is also clearly visible.


Pottery of late Kulli culture - the Harappan

Pottery of late Kulli culture - the Harappan influence is manifest

influence is manifest

In the world of south Asian archaeology, the name Kulli fascination of those interested in the origins of the Indus Civilization and in the Harappan’s contacts with the west. The Kulli folk lived in the hills

of southeastern Baluchistan and produced style of pottery and figurines which had many elements in common with those of the Harappans at Mohenjodaro. There has always been chronological relationship between Kulli and the Harappans and about the cultural and economic relations between them. Recent field certainly that Kulli was not pre-Harappan but was thriving during at least the first part of the mature Indus civilization. Also it appears that they highland neighbors intermediaries between the Indus and the Near East, as has been suggested by Rather, the Kulli folk appear to have been

related intimately - economically and culturally - with the Harappans. In fact, the
There are some tantalizing indications that
the Kulli people were the middlemen who were in
commonality between the two cultures is such that the Kulli culture could be safely

volved in trade between the Mesopotamians and
considered as an hilly manifestation of the Harappan Civilization.
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During his tour of Gedrosia, the Greek name for southern Baluchistan and Makran, excavated from burial cairns on the island of Umm
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involvement in the assumed communications be
tween the Indus Valley and Mesopotamia.The relationship - chronological, cultural and

economic - between the plain Happans and these
enigmatic Kulli people remain one of the most fas
cinating problems in Pakistan's archaeology. The
limited amount of archaeological evidence available
so far suggests that Kulli culture was at its height
just prior to the advent of Harappan period. Just
how much overlap there was is a moot question.
Some recent opinions treat the Kulli culture not as a
separate culture but a hilly manifestation of the Harappan culture itself. A broad similarity between the material evidence of the two gives credence to these opinions.

The Kulli culture has already been covered in some detail in Chapter 5. The distribution of the Kulli sites makes it the largest cultural horizon in the mountains, but very little is known about the nature of this westerly shade of the Indus Civilization. Political unrest and safety concerns for the excavating teams made impossible any research in this area, which is sorely needed. As a consequence the relations among Kuli, Harappan and Arabians have remained an open question, even difficult to formulate in appropriate terms. Equally enigmatic is the origin of the Kulli culture and its geographic extant. Since Neolithic times the population in the highlands of southern Baluchistan was scattered in a

mosaic of small oasis and wide pasturelands, but by the end of the third millennium BC they had reached a higher level of social integration. Whereas most sites further north were slowly abandoned with growing integration with the Indus Civilization, the southern settlements somehow remained intact. This gave rise to a cultural tradition which can be termed as Harappan on one hand and an entirely separate culture on the other.

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Chapter 8

Harappa and the Upper-Indus Towns

Harappa and the Northern Towns
Chapter 7

Harappa and the Northern Towns



The city of Harappa has

The city of Harappa has been one of the most important any other related site has yet been excavated. The centers of been one of the most imIndus population during the Mature Harappanonly information that is available to us about this portant
period in the northernof Indus Indus Valley; the other being
centers Harappan city and the villages surrounding it comes Ganweriwala in Cholistan. The latter has not yet been population during the Mafrom a survey report by M.R.Mughal (2,3,4).
ture Harappan period
was a large city, probably
inexcavated and we do not know much about it except that itIndianarchaeologistsandtheirstudentslarger than Harappa itself.working in the Indo-Gangetic Divide have been trip
the upper Indus Valley; the
Kalibangan, a small Harappan town on the Indian side of the
other being Ganweriwala in ping over each other in their search for the “Indus
Indo-Pak borders, has recently come in prominence and it has

Cholistan. sites” on the Indian side of the border since 1950’s been extensively excavated. The latter has not yet been excavated and this over-eager atmosphere, unchecked by any

Harappa must have anchored several small towns around it
and we do not know much academic prudence and a benign neglect by interand must have held a large rural area under its control.

about it except that it was a national scholarship, has generated a large body of large city, probably larger Similarly the city of Kalibangan must have its own support structure in the form ofdoubtful archaeological data. This has muddied the small towns and villages around it. The remains of these settlements are, however,
than Harappa itself. Kalibangan, a small Harappan already existing pool of knowledge which was not unavailable to us. This is not for lack of any search but for the destruction visited upon

town on the Indian side of the Indo-Pak borders, that extensive to start with. An analytical treatment these sites and the area around them by economic development during the past several
has gradually come in prominence and it has been of Harappa, Ganweriwala, Kalibangan, and the sur centuries. Compounding this dearth of information about the northern domain of the
extensively excavated. Besides these, there are a rounding Indus towns would, therefore, not be pos Harappan world is an evident lack of robust data about Harappa itself as, compared
few other towns of varying sizes in the same area, a sible here; we shall content ourselves merely by awith Mohenjodaro, archaeological evidence about Harappa is rather. sketchy. The
few of them have been excavated but full archaeo descriptive exposition of these individual sites. Thearchaeological remains of this large Harappan city had already been robbed or at least
logical reports on them are not yet available. A largeseverely disturbed before any excavations at the site ever began. Furthermore, no other state of metallurgical and ceramic arts as well as settlement, Rakhigarhi, in Haryana (India), has northern Harappan town, barring Kalibangan, has been excavated in this general area,that of other aspects of technology has been igwhose results could be used to verify the cultural and economic bearings of the

been discovered through surface surveys but not nored, as these topics have been discussed in
Harappan Civilization in the north. Contrary to Harappa and Kalibangan, the city of
yet excavated to any significant extent. separate chapters in context with the technological Ganweriwala shows a robust presence of Harappan settlements around it but neither the
Harappa must have anchored several small assessment of Harappan Civilization in general.
city itself nor any other related site has yet been excavated. The only information that is

towns around it and must have held a large rural The same applies to the Harappan trade, seals, and available to us about this Harappan city comes from a survey report by M.R.Mughal.
area under its control but only a few such rural setthe objects of art. These have been dealt with only

tlements are known. This is not for lack of any
in outlines.
Indian archaeologists and their students working in the Indo-Gangetic Divide have been
search but for the destruction visited upon thesetripping over each other in their search for the "Indus sites" on the Indian side of the **Geographic and Ecological Context:** Setborder since 1950's and this over-eager atmosphere, unchecked by any academic
sites and the area around them by economic devel tlement pattern in the northern part of the Indus Val
prudence and ignored by international scholarship, has generated a large body of
opment during the past several centuries. Surveys ley is unique: these cities, especially Harappa, ap doubtful archaeological data. This has muddied the already existing pool of knowledge
in the Beas basin have revealed a few agricultural pear to exist in a near vacuum. As stated else villages
which was not that extensive to start with. An analytical treatment of Harappa,
(1) and they seem to be an integral part of where, no Harappan site has been discovered in

Ganweriwala, Kalibangan, and the surrounding Indus towns would, therefore, not be
the Harappan domain. Similarly the town of Kalithe area west of Harappa although a few Early In possible here; we shall content ourselves merely by a descriptive exposition of these

bangan must have its own support structure in the dus sites are definitely known. In an area which has individual sites. The state

of metallurgical and ceramic arts as well as that of other
form of small towns and villages around it. The rebeen subjected to much field work and archaeologi aspects of technology has been ignored, as these topics have been discussed in separate
mains of these settlements are, however, not de
chapters in context with the technological assessment of Harappan Civilization in cal attention, this is a very unusual settlement situatected.

Compoundingthisdearthofinformation about the northern domain of the Harappan world is an evident lack of robust data about Harappa itself as, compared with Mohenjo-daro, archaeological evidence about Harappa is rather sketchy. The ar chaeological remains of this large Harappan city had already been robbed or at least severely dis turbed before any excavations at the site ever be gan. Furthermore, no other northern Harappan town of urban culture, barring Kalibangan, has been ex cavated in this general area, whose results could be used to verify the cultural and economic bearings of the Harappan Civilization in the upper Indus Valley. Contrary to Harappa and Kalibangan, the city of Ganweriwala shows a robust presence of Harappan settlements around it but neither the city itself nor
tion. The questions that naturally arise are: Why does this settlement pattern exist and what does it tell about the interaction and support networks necessary for the existence of a major city? Further, what can it tell about Harappa's function in the greater Indus Civilization? Marcia Fenstress (5), Possehl (6,7,8), Wright (1) and Ratnagar (9) have speculated on these questions, some of their thoughts are reflected in the followings.

Harappa is central to a large, well-watered plain surrounded on three sides by mountain ranges bearing varied resources. At a distance of 300 to 400 km to the west, north and east lie the Sulaiman Range and the Himalayas, respectively. Only half a distance away are deposits of rock salt and colorful ores of iron which were evidently used for the painting of pottery. The great plains which stretch from the Peshawar valley to the Indo-Gangetic Divide are of one piece, environmentally speaking. Endowed with several major rivers, the plains also have predictable rainfall ranging between 20 and 70 centimeters per year. Unlike the rains in Lower Indus Valley and Baluchistan where the rain is restricted to the winter season, the rain around Harappa comprises both of summer monsoons and the winter showers, thus supporting both the *kharif* and *rabi* crops.

The only Harappan site in the immediate vicinity of Harappa which can be thought of as contemporary to it is the site of Chak Purbane Syal, 15 miles to the southeast. There is another Indus site, Jalilpur, about 30 miles to the southwest but it is an Hakra river has lead to the discovery of a large number of archaeological sites: Mughal recorded over 170 Harappan sites on the Pakistan side of the border, representing one of the most impressive archaeological feats of the last century (4). When placed within the context of the distribution of Indus sites generally, they lead us to a consideration that Cholistan may have been one of the principal regions for Harappan grain production, the 'breadbasket' for the North and the East, as it were.

The large number of Harappan sites in Cholistan is due to the presence of a rich inland delta of Ghaggar-Hakra river which spread around Fort Derawar in Bhawalpur division and created a large

Harappa and the Northern Towns!
tract of naturally irrigated land for farming and pas
Early Indus site. About 200 km south and west of
ture. The maps of the Early, Mature, Late, and post
continuously inhabited from 3,800 BC onward. As stated above, the early cultures seem Harappa
along the old Hakra River are more than
Indus sites from Cholistan give us the broad out
to have their roots in the Hakra Ware culture which was then predominant in the vast 170 Harappan sites, which seems to serve a large
lines of the relative strength of flow in the ancient
area of Cholistan. The site continued to expand and reached its full extent of over 100 Harappan city
near Ganweriwala in the Cholistan
Ghaggar-Hakra from Hakra Ware times (the pre

hectares during the mature Harappan period between 2600 and 1900 BC. This time Desert. To the east, in the nearby Indo-Gangeticperiod is represented by the open sections of mound AB and F and are therefore of Indus period) through the early Iron Age. The very Divide, are a few authentic Harappan sites, some ofinterest to us in context with our discussion on the Mature Harappanhigh number of settlements in the Harappan period which have been excavated. Kalibangan amongCivilization. Harappa's unique town plan is at its most obvious during this period, atsuggests a resurgence of the river and formation of

them is noteworthy. Although neither Harappa nor
least for self contained walled centers, each on its own raised mounds. Cemetery 37 also
a rich, well-watered inland delta after a period of
Kalibangan show any closely connected networks
represents this time period while the Cemetery H is the result of the final transformation
relatively lower volume of flow. Then, in the post
of villages and small towns around them, Ganweri
of this urbanized, literate civilization into a mosaic of non-urban cultures demonstrating
Harappan period of Cemetery H culture, we see a
wala in Cholistan seems to have such an extensive
little socio economic integration. Its excavators have proposed the following
two-step retreat of the river to the East, eventually

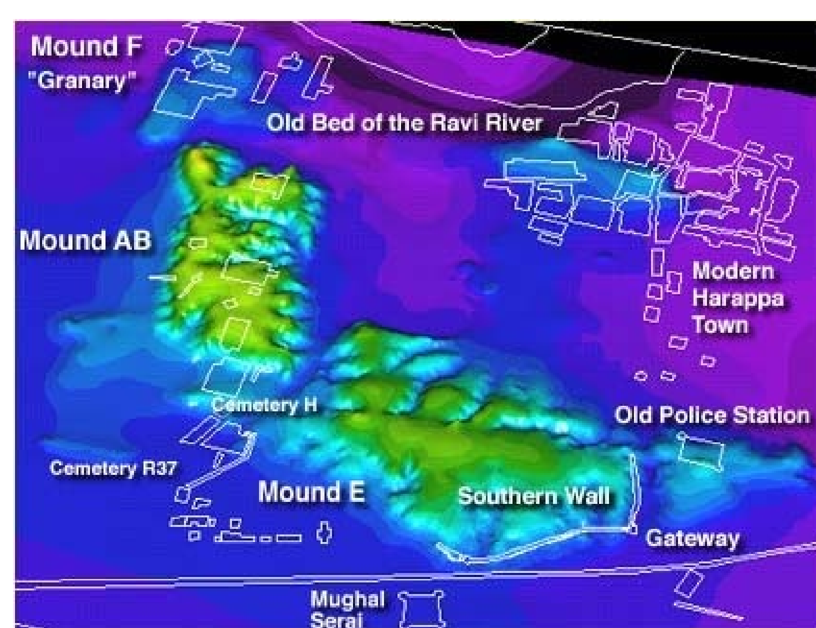
network of agricultural and industrial settlements chronology: with insufficient flow to even reach the old Fort Deraround it. Wright and coworkers have surveyed the 1.Ravi Aspect of the Hakra phase: c.3500-2800 BC awar delta. This seems to be a reasonable picture Beas basin near Harappa and have come up with a 2.Kot Dijian (Early Harappan) phase: c.2800-2600 BC but, as will be seen later, there is no clear archaeonumber of rural settlements (1). 3.Harappan Phase: c.2600-1900 BC logical evidence to prove this hypothesis.

It has been argued that the prime agricultural 4.Transitional Phase to de-urbanization: c.1900-1800 BC land around Harappa is found immediately north 5.post-Harappan Phase: c.1800-1300 BC HARAPPA
east of the site between an old bed of the Ravi and

Following its abandonment in the second millennium BC, the upper parts of its mudthe present channel of the Ravi.

The area is low-lying land and could have been irrigated by flood irrigation through old *bunds* of the river. The Kamalia Plain immediately across the Ravi is well watered by a large hill *nai* flowing down from the high ground of the *Rechna Doab*. These two areas taken together provide almost 6000 square km of immediately available farm land for Harappa, thus precluding any necessity for dependence on a wide ranging network of agricultural villages for its food needs. This argument seems to be logical enough but it still does not answer the question of nonexistence of Harappan sites even in this immediate fertile bowl. The settlements in the Beas basin, to the northeast of Harappan seems to be a partial answer (1).

The situation to the southwest of Harappa is quite different. Archaeological Harappa, the type-site of the Indus Civilizaresearch along the now largely dry bed of Ghaggartion, is today a large village in the Sahiwal District of



The layout of the Harappa ruins and the surrounding topographic area (Kenoyer)

The layout of the Harappa ruins and the surrounding topographic area (after Kenoyer)

Punjab, 15 miles southwest of the district town. It consists of a series of low archaeological mounds and cemeteries to the south of a dry bed of the Ravi river. The site is situated at a place where the entrenchment of the Ravi River broadens, not surprisingly, into an area where substantial agriculture is possible. The plan of the site shows that at one time

the river flowed close by and that it has sinceHarappa and the Northern TownsPunjab. Its occupied area is now estimated at over

shifted some six miles to the north in keeping with its maturity. Thus, as with Mohenjo-daro, proximity to the river was clearly a necessity in picking the

settlement location.Harappa

150 hectares, out of which *ca.*! 442 x 244 m area is

occupied by the western mound and roughly a 300 m square area by the mound near the Ravi. Archaeological deposits dating to the Mature Harapwere begun by the Harappa Archaeological Research Project (HARP), under the direction of George F. Dales and J. Mark Kenoyer. After the death of Professor Dales, Meadow joined the team as a co-director of the Project and played an important role in interpreting the archaeological finds.

Harappa is the largest Indus site excavated in  **An artistic rendering of the city of Harappa**

An artistic rendering of the city of Harappa

Although covering a full extent of 150 hectares the site and its buffer zone comprises eight mounds and two cemeteries – the remainder being pan have been found under alluvium around
the city, and no one is certain of the city's ex

Harappa, the type-site of the Indus Civilization,

act size - it may perhaps be as large as 200

is today a large village in the Sahiwal District

inhabited at any one time. In this respect, the

of Punjab, 15 miles southwest of the district

occupation area is almost of the same size.

town. It consists of

With a population density of about 200 people

a series of

per hectare, and 100 hectares settled at one

archaeological mounds and cemeteries to the

time, total population would have been ap

south of a dry bed of the Ravi river. The site is

lation at its greatest prosperity is about 65,000

situated at a place where the entrenchment of

Archaeologically, the settlement of Harappa is

the Ravi River broadens, not surprisingly, into an area where

were founded on virgin land, Harappa is an old

substantial agriculture possible. The plan of the site shows that at one time the river flowed close by and that it has since shifted some six miles to the north, in buried deep beneath the surrounding agriculturalkeeping with its maturity. Thus, as with Mohenjodaro, proximity to the river was clearly

land or the modern village of Harappa. A network of

a necessity in picking the settlement location.

concrete paths links most of these mounds. There are a number of historic structures scattered across

the property including an un-conserved Gupta peAlthough covering a full extent of 150 hectares the site and its buffer zone comprises riod temple, a partially conserved mosque, the recently excavated foundations of a Mughaleight mounds and two cemeteries – the remainder being buried deep beneath the the ruins of a colonial police station.surrounding agricultural land or the modern village of Harappa. A network of concrete The site at Harappa was first briefly exca



vated by Sir Alexander Cunningham in 1872-73; two paths links most of these mounds. There are a number of historic structures scattered

decades fater brick robbers carried off the visible

across the propertyremains of the city (see Chapter 3 for details). Theincluding an

first extensive excavations were started by Sahni of

Archaeological Survey of India in 1920. His work conserved mosque, the recently excavated foundations of a Mughal serai and the ruins

The high mound at Harappa (Mound AB) is surrounded

un-conserved Gupta

by a massive mud brick city wall with large square ram

period temple, a partially

parts. One of these eroding ramparts is visible through the underbrush that now covers the site. The flags mark

the tomb of a Muslim saint that was built on top of the ancient city wall thousands of years after the city was abandoned

and the contemporaneous excavations at Mohenjo

of a colonial police station.

daro first brought to the world's attention the existence of the forgotten Indus Valley civilization as the

earliest urban culture in South Asia. His work was

earliest urban culture in South Asia. His work was **followed later in the decade by that of Vats, also of site, with initial settlement going back to the Hakrathe Archaeological Survey of India. Excavations by 73; two decades after brick robbers carried off the visible remains of the city (see other archaeologists continued in the 1930's, and in plary excavation indicated that on the original site, Chapter 3 for details). The first extensive excavations were started by Sahni1946 Sir Mortimer Wheeler excavated the so-called villages of Baluch affinity had once existed (see**

fortification walls and found the first Early Indus (Kot

Archaeological Survey of India in 1920. His work and the contemporaneous Dijian) deposits below the Mature Harappan strucArchaeological Research Project (Kenoyer andtures. After independence, Harappa was excavatedexcavations at Mohenjodaro first brought to the world's attention the existence of the by Mughal of the Archaeological Department of firmed this conclusion. These investigations, in adPakistan in 1966. In 1986, the first systematic,forgotten Indus Valley civilization as the earliest urban culture in South Asia. His work

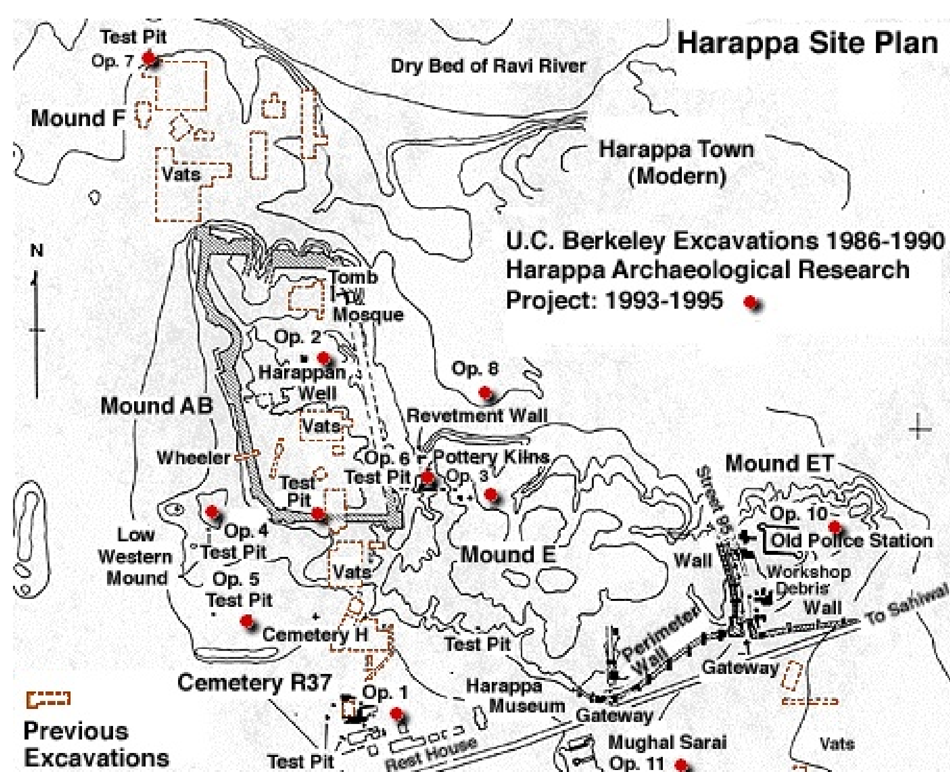
multi-disciplinary excavations of an Indus Valley city
dition to confirming the presence of a variant of

was followed later in the decade by that of Vats, also of the Archaeological Survey of 178 India. Excavations by other archaeologists continued in the 1930's, and in 1946 Sir Mortimer Wheeler excavated the so-called fortification walls and found the first Early

Hakra Ware culture (the Ravi Phase) at Harappa, emphasize the crucial role of Kot Diji culture of the Early Indus Period as the main cultural substratum of the Mature Harappan township. They convincof the Mature Harappan township. They convinc 2600 BC when essentially a rural culture transformed itself into an essentially urban civilization.

Since a planned city, as Harappa has been in its youth, could not have arisen from a nonorganized haphazard Early Indus
Wheeler proposed that successive
settlement,

flooding occurred that practically destroyed the Early Indus occupation. Kenoyer and Meadow are silent on this account but it is clear that city must have been destroyed, under natural disasters or as a deliberate action, before it could be rebuilt according to a well thought of plan, like Mohenjo-daro and some of the



the period between the fourth and second millennium BC. The site seems to be continuously inhabited from 3,800 BC onward. As stated above, the early cultures seem to have their roots in the Hakra Ware culture which was then predominant in the vast area of Cholistan. The site continued to expand and reached its full extent of over 100 hectares during the Mature Harappan period between 2600 and 1900 BC. This time period is represented by the open sections of mound AB and F and are therefore of primary interest to us in context with our discussion on the Mature Harappan Civilization. Harappa's unique town plan is at its most obvious during this period, at least for self contained walled centers, each on its own raised mounds. Cemetery 37 also represents this time period while the Cemetery H is the result of the final transformation of this

City plan of Harappa

other Harappan cities.This speculation is obviously predicated on the assumption that Harappa was in fact a planned city, laid down according to a well thought of plan. According to some archaeologists, it is just an assumption that essentially arose from observations at Mohenjo-daro. There are other archaeologists who would admit to a well laid-out plan but evoke the notion of planned settlements originating right from the Early Indus era. They point to the absence of a clear break anywhere in the inhabitation history of the town since the early fourth millennium BC. This is a powerful argument and difficult to ignore in the face of the archaeological evidence provided by the HARP scientists.

The archaeological sequence at the site of Harappa is over 13 meters deep, spanning urbanized, literate civilization into a

mosaic of non-urban cultures demonstrating little socio economic integration.

Habitational Sequence: Harappa is one of the very few Indus sites where an unbroken sequence of occupation has been found, connecting the city with the earlier village. In fact, the site of Harappa is the only major Indus site for which we have an excavated sequence from the early Preurban period through the subsequent Urban and Post-urban periods, making it one of the most important sites in the Harappan Civilization. In that respect, the archaeological research at Harappa opens for us a window to the origin of the Harappan Civilization or at least gives us a reason to speculate on the birth of the Harappan Civilization.

Thus by learning the evolution of the city of Harappa, we learn the evolution of the city of Mohenjodaro and, by association, that of the other cities of this civilization. The Harappan remains are also important for elucidating the post-Harappan period of the settlement, when Harappa ceased to be a city and reverted to a abandoned settlement or a village of semi-agriculturist people. The excavations in the Cemetery H area (1900- 1300 BC) have provided invaluable information on the nature of the Late and post-Harappan subsistence, architect and every day life.

Harappa's excavators have proposed the following chronology:
1. Ravi aspect of the Hakra phase: ca. 3500-2800

BC
2. Kot Dijian (Early Harappan) phase: c a . 2 8 0 0
2600 BC
3. Harappan Phase: ca. 2600-1900 -1800 BC 5. post-Harappan Phase:ca. 1800-1300 BC Following its abandonment in the second millennium BC, the upper parts of its mud-brick struct brick structures eroded sufficiently to protect those below. The historic occupation of parts of the site although frequently reusing bricks of the Harappan period, had little impact but three subsequent developments greatly affected the site. First, the removal of thousands of bricks for railway ballast in the 1850s destroyed many of the late phases of occupation; second, the increasing use of irrigation

Table 8.1. Chronology of Harappa
bonized seeds, representing dozens of species.

Period 5
Period 4
Period 3 C Period 3B Period 3A Period 2
Period 1
Late Harappan Phase Transitional
Harappan Phase
Harappan Phase
Harappan Phase
Transitional (Kot Diji) Early Harappan (Ravi)

The Pre-Urban Phases: Table 8.1. presents the chronology and cultural sequence of Harapa in outline. The Period 1 and 2 represent the pre-urban level, while Period 3, divided into three segments, is the urban level, that is, the Mature Harappan Civilization. Period 4 and 5 are post Harappan.

One of the most important discoveries during 1946 was when Wheeler noted the presence of an 'alien culture' beneath the city wall he was then digging. These cultural deposits were later identified by Mughal as belonging to the Kot Diji phase of Early Harappan phase. He also suggested that the lower

portion of the inner

ca. 1800-1700 BC part of the huge perimeter wall might be ca. 1900-1800 BC Early Harappan in date. A re-examination of ca. 2200-1900 BC this trench in 1997-98 by Kenoyer and ca. 2450-2200 BC Meadow determined that indeed there was ca. 2600-2450 BC a substantial Early Indus occupation deposit ca. 2800-2600 BC with hearths, stone tools, figurines, and lots ca. 3300-2600 BC of pottery. An Early Harappan wall was also

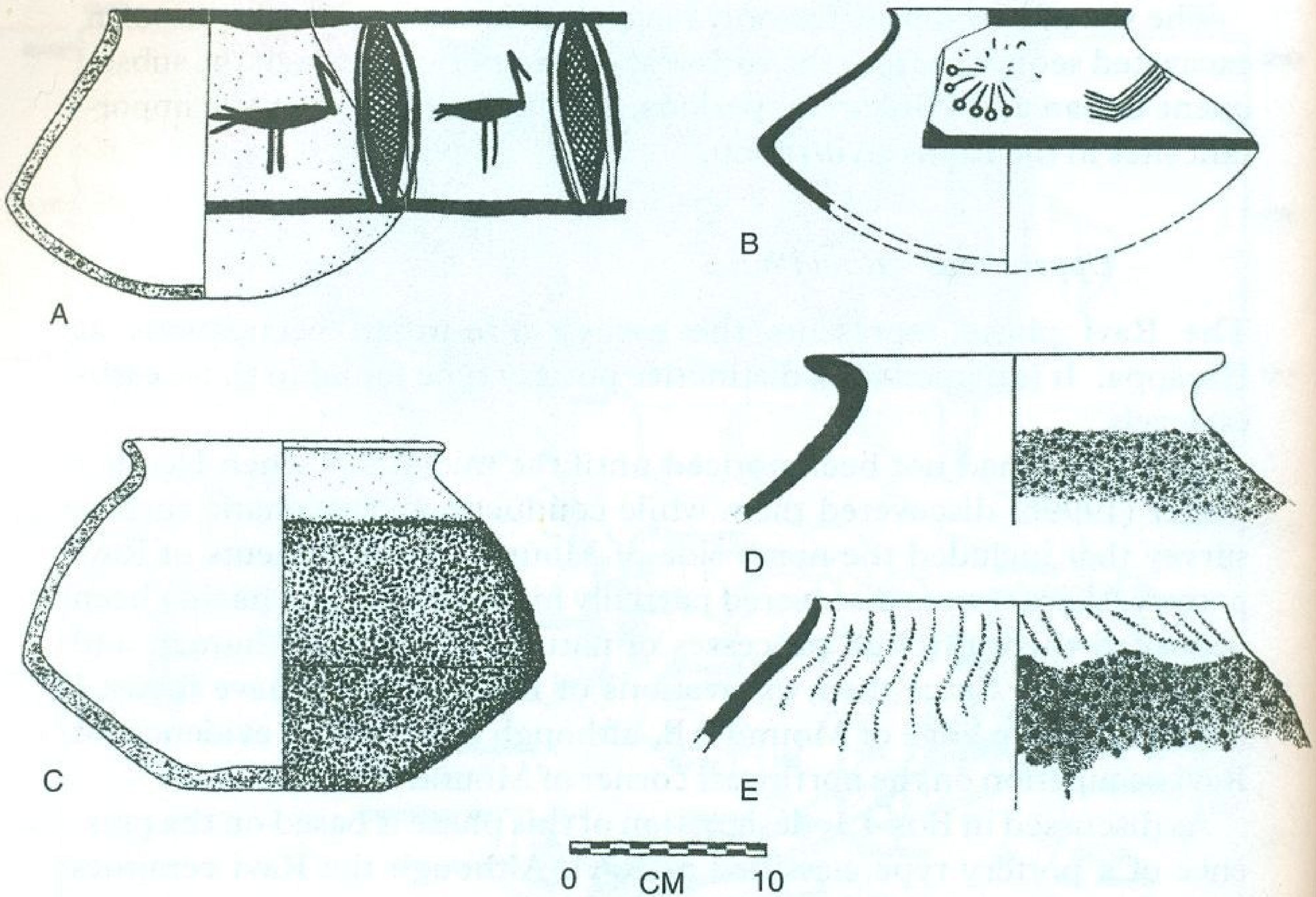
identified, but it was below the area designated by both Wheeler and Mughal.

agriculture resulted in gross salivation in the area; third, archaeological excavations exposed structures to the destructive nature of the environment. As a result many of the structures exposed and conserved by Wheeler in the 1940s have been completely destroyed. Harappan Archaeological Research Project, under the direction of Kenoyer and Meadows, have tried to arrest this destruction in cooperation with the Archaeological Department of Pakistan.

At its height, Harappa was a fully developed city complex, housing a population in excess of 35,000 people. Based on city layout, styles of painted ceramics, and inscribed seals and weights, we can conclude that the inhabitants of this site shared the same culture with other Indus Civilization sites (16). Harappa is not only the "type" site of this civilization but it is one of the most important; any trends identified here have significance for the culture as a whole. The most recent excavations at this site began in 1986 and continued for a number of years (17,18,19). Though these excavations have exposed only a small portion of the settlement, all of the major mounded areas of the site have been trenched. A significant amount of new data has been uncovered over the past twenty years that have provided new insights into Harappa's formation, character, evolution, and decline. With the collection and dating of carbon samples, a good chronology now exists.

Harappa is not only one of the few sites that span the complete temporal range of the Indus civilization, but is also one of the few sites where large numbers of archaeobotanical samples have been collected and analyzed in a systemic manner. This has led to the collection of tens of thousands of carIn 1996-98 Kenoyer and Meadow discovered even an earlier cultural horizon at

Harappa. This cultural phase, named the Ravi Phase, after the nearby Ravi River, lasted from approximately 3300 BC (or even from 3500 BC) to 2800 BC. It is related to the Hakra Phase, dating to *ca.* 3100 BC. Of particular interest are the pottermarks type inscriptions on baked pottery sherds,



Comparison of pottery styles from Harappa and Cholistan (*Harappa Archaeological Research Project***)**

which may be thought of the samples of early writing. Dating from *ca*. 3300-2800 BC, these inscriptions have pushed back the origins of the Indus script-like signs by almost 500 years. This would make the origins of writing in South Asia approximately contemporary with the development of writing in both ancient Egypt and Mesopotamia. At least this is the belief of Kenoyer and Meadow who have

designated by both Wheeler and Mughal. In 1996-98 Kenoyer and Meadow discovered even an

earlier cultural

spent considerable time and energy in excavating at

horizon at Harappa. This cultural phase,

Harappa and analyzing their diverse finds.

named the Ravi Phase, after the nearby The Ravi phase represents the earliest Pre

urban occupations at Harappa. It is named for a

Ravi River, lasted from approximately

distinctive pottery type found in those earliest levels.

3300 BC (or even from 3500 BC) to 2800Ravi wares had not been noticed until the mid

1990s when Heather Miller (13) discovered them

BC. It is related to the Hakra Phase,

while conducting a systematic surface survey that

identified in the Ghaggar-Hakra river included the north side of Mound AB. Fragments of

Ravi pottery (sherds) were discovered partially hid

valley to the west, and predates the Kot

den in gullies, having been deposited there through

Diji Phase (2800 -2600 BC). Some of the

processes of natural erosion and human and animal traffic. Since then, excavations of Ravi materials

most exciting discoveries in Ravi Phase

rim and gradually tapers to a carination, whereas the other (b) has an out-turned rim and a more abrupt and angular carination. Other differences areHarappa and the Northern Towns illustrated by comparing the Ravi pot (c) with the other examples illustrated. The Ravi pot has a flat

The Ravi and the Kot Diji Phases: One of the most important discoveries during 1946 base. Its textured surface is similar to that of the was when Wheeler noted the presence of an 'alien culture' beneath the city wall he was

slurry (sandy materials mixed with clay) and rim

then digging. These cultural deposits were later identified by Mughal as belonging to

shapes differ (14). Finally, both of the Ravi vessels shown in the figure are hand-built (14) while the

the Kot Diji phase of Early Indus period. He also suggested that the lower portion of the

Hakra example (b) is wheel made; others illustrated

are hand-built (4).inner part of the huge perimeter wall might be Early Indus in date. A reexamination of

In spite of significant erosion in the deposits,

this trench in 1997-98 by Kenoyer and Meadow determined that indeed there was a
500



This Ravi Phase hand-built pot with poly This Ravi Phase hand-built pot with poly

both

chrome design was found next to the one with inter
chrome design was found next to the one
secting circles illustrated above. The net and bird
with intersecting circles illustrated above.**motifs are found at other sites to the northwest in Bannu district, but they do not continue into the later**
The net and bird motifs are found at other **Kot Diji**
sites to the northwest in Bannu district, but
and Harappa Phases

they do not continue n into the later Kot Diji
and Harappa Phases
have focused on the northern edge of Mound AB, although there now is evidence for an Era of Ex

Page 211 pansion and Transformation.
Although the Ravi ceramics bear close similarities to the Hakra wares found at contemporary sites in Cholistan and elsewhere, they are sufficiently different to warrant a typological distinction. Naming the pottery Ravi, after the river on whichHarappa is situated, emphasizes its local characteristics. The examples in Figure above illustrate the similarities and differences between the Ravi and Hakra ceramics. Both were produced from clays that fired to a red color and were decorated with black paint/slip; many have burnished surfaces, a process that results in a polished or shiny exterior. Other slips used were brown and white. Many Hakra and Ravi ceramics have textured surfaces. The differences between them, then, are in the shapes of vessels and/or the ways in which their decorations are combined. For example, in Figure above the two vessels (a, b) have similar shapes; both have rounded bases and are painted. However, their upper bodies differ, one (a) has a simple

**Dating to ca. 3100 BC, this hand-built pot with polychrome**
Dating to c. 3100 BC, this hand-built pot with
decoration is one of the earliest identified in the Ghaggar
polychrome decoration is one of the earliest
Hakra river examples of intersecting circle motif in the Inexamples of intersecting circle motif in the In
dus valley. This motif along with others, such as the fish
scale and pipal leaf designs, continue to be employed into
dus valley . This motif along with others, such
the later Kot Diji and Harappa Phases. as the fish scale and pipal leaf designs, con
tinue to be employed into the later Kot Diji and Harappa Phases.

substantial Early Indus occupation deposit with hearths, stone tools, figurines, and lots of pottery. An Early Indus wall was also identified, but it was below the area designated by both Wheeler and Mughal. In 1996-98 discovered horizon at Harappa. This cultural phase, named the Ravi Phase, after the nearby Ravi River, lasted from approximately 3300 BC (or even from 3500 BC) to 2800 BC. It is

related to the Hakra Phase, identified in the Ghaggar-Hakra river valley to the west, and predates the Kot Diji Phase (2800 -2600 BC). Some of the most exciting discoveries in Ravi Phase

the evidence for the Ravi phase at Harappa includes a well-defined stratigraphic profile with many *in situ* features and activity areas. Structures were

levels have been the exquisite hand-made

built of wooden posts and walls were constructed of plastered reeds. Many different living floors were

and painted pottery, stone and bone tools,

superimposed one above the other, representing

and stone beads, all of Hakra Ware affinity.successive rebuilding. They were associated with

domestic
use
and
craft
production,
and feature

Of particular interest are the potter-marks

kitchen areas where cooking pots were found in

type inscriptions on baked pottery sherds,
grain.which may be thought of the samples of early

Many different crafts were being produced

writing. Dating from c. 3300-2800 BC, these

terracotta beads, bangles painted with bands or

inscriptions have pushed back the origins of

fired to a gray color and decorated with incised de

the Indus script-like signs by almostbangle 500

pinched exterior ridges. Also present were terra

years. This would make the origins of writing

cotta human (seated females) and animal (bulls)

in South Asia approximately contemporary figurines. Bone artifacts included points that may

have been projectiles, awls, and spatulas for bas

with the development of writing in both

ketry or leather working and a spindle whorl for

ancient Egypt and Mesopotamia. At least this is the belief of Kenoyer and Meadow who [181]have spent considerable time and energy in excavating at Harappa and analyzing their



This Ravi Phase hand-built pot with polychrome design was found next to the one with intersecting circles illustrated above. The net and bird motifs are found at other sites to the northwest in Bannu district, but they do not continue n into the later Kot Diji

and Harappa Phases

reflected in the layout of north-south and
east-west orientated streets and houses, and
the use of mud-bricks of two sizes with

1.2.4 ratios to build houses, massive mud

brick platforms, and perimeter walls. In
addition, the site was divided into two

Other crafts included ornaments in various distinct mounds each with a massive mud phase. The scale of urban networks is smaller than stages of production (14). Several varieties of non brick perimeter wall. During this period that characteristic of the subsequent Harappan local stone were usedand different production techHarappa emerged as a major regional phase, but many of the basic characteristics of later niques applied. For example, steatite blanks werecenter, integrating its hinterland as well as Indus society are identifiable.
being prepared with a toothed copper saw and per obtaining materials from distant resource Kot Diji pottery is widely distributed throughforated with a copper drill, while beads - short cylin areas. out the Indus Plain. The most typical forms are

This fired steatite button seal from the Kot Harappa and the Northern Towns
drical lapis and carnelian - were made using a dif
The wide variety of raw materials used in
! short-necked jars decorated with a variety of exteri
Dijian Phase (Period 2, 2800-2600 BC)
ferent technique. While the lapis beads were perfospecialized crafts during the Kot Diji phase
shows a unique pattern that may be an early ors, including banded (with black, brown, white or

Harappan phase, but many of the basic characteristics of later Indus society are red paint/slip) rims; surfaces textured with a sandy, rated by pecking, carnelian was drilled with a cylin identifiable. networks that were initiated during the earlier Hakra/Ravi phase. Marine shells were brought from more than 860

kilometers away for ornament manufacturing. Various rocks and minerals were imported over distances of 300 to 1000 kilometers for the production of utilitarian objects such as grinding stones and chipped stone tools as well as for the manufacture of ornaments such as beads and inlay. The use of similar raw materials from different resource areas, such as gray black chert from Baluchistan and tan chert from Sind, indicates a competitive expansion of trade networks and the increasing importance of exotic items. The



use of raw materials from these diverse
source areas also indicates the cultural and

This Early Harappan seal impres
technological integrationDijian Phase (Period 2, 2800-2600 BC) of Baluchistan,
sion or sealing of a square seal has

Sind, and Punjab that was soon to come in
several script signs and two ladder
full bloom. At the same time, the absence
of
like motifs (Kot Diji Phase, c. 2800 or

earlier Hakra/Ravi phase. Marine shells
The total area of the Kot Diji settlement at Harappa is more than 25 hectares and covers most of Mound AB, Mound E and parts of Mound EF. Early city planning is reflected in the layout of north-south and east-west orientated streets and houses, and the use of mud-bricks of two sizes with 1.2.4 ratios to build houses, massive mudbrick platforms, and perimeter walls. In addition, the site was divided into two distinct mounds each with a massive mudbrick perimeter wall. During this period Harappa emerged as a major regional center, integrating its hinterland as well as obtaining materials from distant resource areas.

This Early Harappan seal impression or seal **This fired steatite button seal**
The wide variety of raw materials used in
from the Kot Dijian Phase (Pe
specialized crafts during the Kot Diji phase
riod 2, 2800-2600 BC) shows a
indicates the continued expansion of trade
unique pattern that may be an on a bundle of goods to seal it and then was
networks that were initiated during the broken off when the bundle was opened.**early form of the Harappan**

red slip; and/or painted with wide and narrow bands (see figure above). Other forms include flanged vessels, bowls, jars, and a dish-on-stand. Geometric and floral designs were painted on the exteriors of some vessels. A "sunburst," pipal leaves, fishscales, and intersecting circles occur on others. These designs and slight variations in some forms continue into the Urban period. **In** general, Kot Diji ceramics were produced on the potter's wheel.

There is a continuous stratigraphic sequence between the Ravi and Kot Diji phases at Harappa, although there is an

expansion of settlement and many structural features are new in the latter. The occupation of Mounds AB and E, already noted for the Ravi phase, continues, but settlement expands to over 26 hectares.

BC). The wet clay was probably
were brought from more than 860 **script sign.** Harappa and the Northern Towns! kilometers away for **placed on a bundle of goods to seal it**
ornament
manufacturing. Various rocks and minerals
drical
stone
drill.
In
addition,

were imported over distances of 300 to
there are quantities of finished and unfin
ished marine shell bangles produced in
differentand chipped stone tools as well as for the presence of lapis,

manufacture of ornaments such as beads
carnelian, and marine shell in the context
and inlay. The use of similar raw materials

of unfinished objects attests to the pres
from different resource areas, such as gray
ence of contact over long distances for
their procurement, making them especially
expansion of trade networks and the valuable due to their rarity. Also discovincreasing importance of exotic items. The were
use of raw materials from these diverse This Early Harappan seal impression or seal
source areas also indicates the cultural and ing of a square seal has several script signs technological integrationies of actual vehicles, perhaps made of
of Baluchistan, and two ladder like motifs (Kot Diji Phase, c. wood, used for transport (14).Sind, and Punjab that was soon to come in
2800 BC). The wet clay was probably placedfull bloom. At the same time, the absence While the discovery of
Ravi cultureon a bundle of goods to seal it and then was of any raw material at Harappa, or broken off when the bundle was opened.at Harappa is important in tracing the his
torical development of the site, the Kot Diji
culture
is
Page 213
important in the under
standing of the Harappan phase itself.
Page 213
styles. The
ered among the Ravi materials



miniature terracotta carts that may be cop



This set of steatite disc beads, each about 1 cm in diameter, were found in Increasing knowledge of Kot Diji Phase **the Kot Diji phase street and appear to be a necklace that was lost in the** occupations at Harappa and of contem clearly visible (after Kenoyer)
porary settlements throughout the Indus anywhere else, coming from the east of the Sutlej shows that the region to the east of Valley permits glimpses of the indigenous origin of Bricks became the principal building material and various hallmarks of later Indus Civilization, from

Harappa was generally unknown or at least alien to the Indus people.
were produced in uniform sizes with a ratio of 1:2:4. pottery to bead manufacture, from writing to building
Craft production indicators from Kot Diji levels show a marked increase in New in the Kot Diji phase is the construction of
construction.
technological complexity and new types of finished objects. The production of glazed
massive
mudbrick
perimeter walls,
separating
steatite beads and seals as well as of faience ornaments resulted from the refinements of
This Early Indus culture was initially proposed
Mound AB from Mound E. Also new are massive
earlier glazed steatite manufacturing techniques. Precious metals such as copper and as representing a phase of incipient urbanism,gold were also employed for both utilitarian and decorative purposes.
Many additional mud brick platforms and what appears to be early based on surveys conducted by Mughal. Kenoyer
styles of bangles, beads, pottery and utilitarian objects reveal the need for increased
city planning in the layout of streets in a north
and Meadow’s excavations at Harappa confirmed
variety for a more diverse urban population. These results are in parallel with other sites

south/east-west orientation (15). The evidence for in the Indus Valley at large where the Early Indus phase butts with the coming
this interpretation. It is now clear that initial urban Harappan phase. development in the Indus region began between While some hand-built containers continued to be made during the Early Indus phase at approximately 2800 and 2600 BC during the Kot Diji Harappa, most pottery was made on the wheel and carefully trimmed, slipped, painted,

182 or decorated with some sort of surface modification. Red slip and black painted designs replaced polychrome decorations of the Ravi/Hakra phase. The motifs include horizontal bands, new styles of geometric and floral motifs, as well as the more traditional pipal leaf, fish scale, and intersecting circles motifs that had their origins in the Ravi/Hakra phase.

walls and platforms suggest fairly large-scale community efforts, standardized ratios of mudbrick same general part of the site. The one designated R-37 is the largest Mature Harappan cemetery known to us. The dead in this place were treated in a variety of ways. Some skeletons have been found in an extended, supine position inside wooden coffins, the
way many contemporary Pakistanis are buried.. In the large number of Harappan-period
graves that have been excavated in R-37, bodies were mostly laid on one side, and an
indicative of a shared system of measurement, and
average of fifteen to twenty pots containing provisions for the afterlife were buried with
possible presence of masonry specialists.
the dead. Stone and bronze ornaments adorned the person but never in profusion. A
Along with the expansion of settlement and
significant number of graves contained bronze mirrors. A few graves contained wooden
the diversity of building projects, there is an in
coffins and/or reed shrouds, which was a Mesopotamian practice. Cemetery H is a
creased number of areas devoted to craft produc
burial ground for Late-Harappan period and contains pot burials and a variety of other
tion, the complexity of technologies employed, the
interments in the earth (fractional, dismembered, and so forth). Cemetry H occupies a
production of new products, and the use of nonlocal

materials. Beads produced from glazed steatitespecial place in Harappan archaeology as it indicates a clear cultural break. These
burials are associated with non-Harappan people, probably the immigrant or invading



peoples from the west.
Since this period belongs to

the tail end of the Indus
Another group of beads from Harappa. A diverse choice of
Civilization or a postAnother group pf beads from Harappa. A diverse choice of stone is evident. Some of these
Harappan culture, it will be
stone is evident. Some of these stones were procured from
long distancestreated in the next volume
of this book.

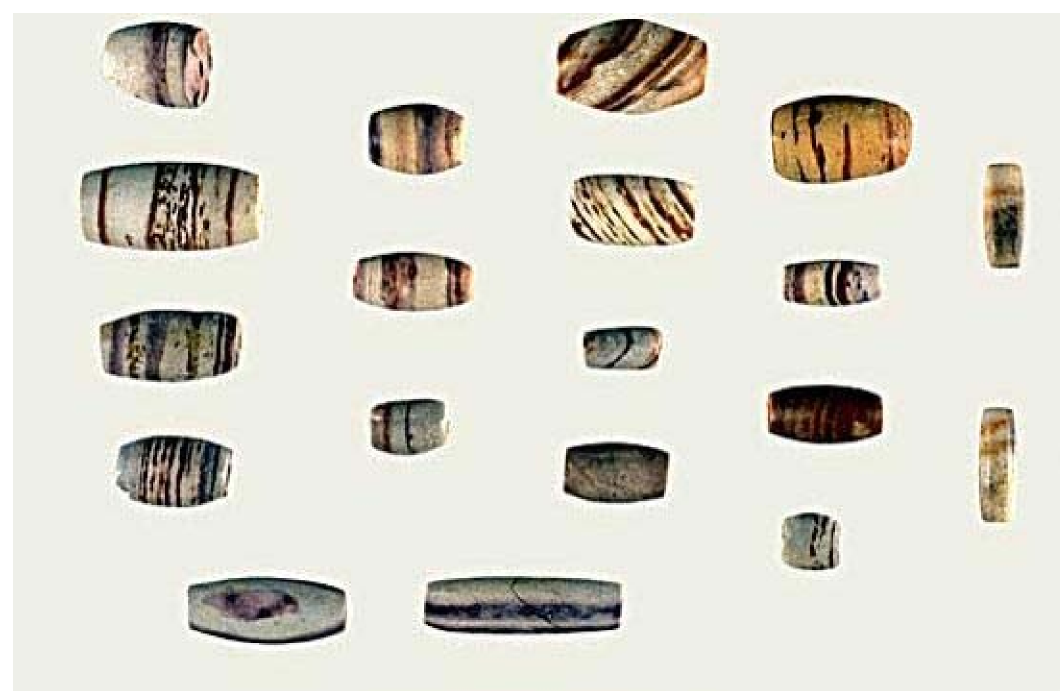
Trade and Technology: It
has been mentioned earlier
that Kenoyer and Meadow



have done some recent
work at Harappa under the
Harappa

A terracotta chicken from Harappa

particularly technological stages of production, and published their results in production, and published their results in 280) under *Trade and Technology of the Indus Valley: New Insights from Harappa, Pakistan*. They do not report any art and craft, or indicate any specific production techniques that have not been reported earlier at other locations. Bead making industry is evident in Period 1 (3300-2600 BC) onward, both hard and soft stones



A group of beads from Harappa. A diverse choice of stone is evident. Some of these stones were procured from long dis

tances



Research Project, focusing on

work, shell working was present

craft production, but not in profusion, copper tools were being made, and the making of steatite seals, chert weights, and carved ivory objects is in



evidence throughout the city. There is evidence that certain trades were concentrated in specific areas, just as they do



presently in almost all cities of

Examples of drinking goblets from Harappa

A Harappan dice of chance found in the rubble at Harappa (Kenoyer)



A collection of inscribed objects found along the



main street leading to the southern gateway of Mound E at Harappa. The fragmentary seal on the left is the earliest seal found to date, and depicts a bovine carved in a very archaic style. At the top center is a terra cotta sealing with two seal impressions.

A Harappan dice of chance found in the rubble at Harappa (after Kenoyer) Two seals and a molded tablet from a large collection found at one single house at Harappa.

Pakistan.
Metal and Terracotta Objects, Pottery, and other Artifacts: The Excavations at

Harappa have yield a large variety of metal and terracotta objects. The number of pottery pieces and pottery sherds have been really large, so is the number of seals and inscribed tablets. Because of their relevance to the Harappan Civilization in general, they have been dealt with elsewhere in related chapters of this book. Suffice here to say

Three sided molded tablet. One side shows a flat bot
that most of the artifacts and steatite seals at Harappa are very similar, in fact identical,
tomed boat with a central hut that has leafy fronds at the

top of two poles. Two birds sit on the deck and a large double rudder extends from the rear of the boat. On the second side is a snout nosed gharial with a fish in its mouth. The third side has eight symbols of the Indus script.



Two seals and a molded tablet from a large collection found at one single house at Harappa.

Two seals and a molded tablet from a large collection Pakistan. **found at one single house at Harappa**

Metal and Terracotta Objects, Pottery, and other Artifacts: The Excavations at 183Harappa have yield a large variety of metal and terracotta objects. The number of pottery pieces and pottery sherds have been really large, so is the number of seals and inscribed tablets. Because of their relevance to the Harappan Civilization in general, they have been dealt with elsewhere in related chapters of this book. Suffice here to say that most of the artifacts and steatite seals at Harappa are very similar, in fact identical,

were already evident in the Ravi phase; however, during the Kot Dijian phase, the production process experienced refinements of the technique, and new objects such as glazed button seals were produced. Other objects providing continuity with later periods are numerous terracotta objects, such as human and animal figurines and cart models. Nonlocal materials include lapis lazuli, carnelian, chert, marine shell, copper, and gold. A very significant find for this phase is a cubical stone weight that conforms to weight categories used as a standard of measurement in the Urban period.

Craft production is evident in several areas. One, on the northwest side of Mound AB, was associated with mud brick walls and hearths, possibly a residential area, where two pottery kilns were dis

extends out onto the plain as if to **Harappan Civilization - The Material Culture** **encompass a large market or open space.**
At the gateway itself, the mud-brick city

pastoral component is defined by the exploitation of

wall is over 9 meters wide and may have domestic cattle, sheep, and goats for meat and their
secondary products.had additional bastions making it up to 11

The total area of the Kot Diji settlement at

meters wide. The gate itself is made from

Harappa is more than 25 hectares and covers most

baked brick with one meter thick walls of Mound AB, Mound E and parts of Mound EF.

Early city planning is reflected in the layout of north

firmly bonded to the mud-brick city wall.

south and east-west orientated streets and houses,

A small projection on the inner eastern

ratios to build houses, massive mud-brick platforms,

edge of the brick gate may indicate stairs

and perimeter walls. In addition, the site was di

leading to the top of the wall. The opening

vided into two distinct mounds each with a massive

in the gate is only 2.8 meters wide, just

Harappa emerged as a major regional center, inte

large enough as to allow one ox cart at a

covered, along with evidence for weaving (a spindle whorl for spinning yarn). In another, on the north westside of Mound E, a potter's workshop was dis covered that consisted of a small pit kiln and pro

is clearly divided into two portions – one Lower Town and one so-called Citadel,
duction debris. The majority of pottery found there
Harappa seems to be a collection of several towns or 'suburbs, spread around a central
was produced on a potter's wheel. To the south of
mounds extending in a circuit of some three and a half miles, the site arose in places up
the potter's workshop, but separate from it, several
to sixty feet high. Early reports noted its immensity. Each major mound was apparently surrounded by a massive mud-brick wall, with brick gateways and bastions located at intervals along each face.


Harappa, Mount E, a perimeter wall (HARP)



time to pass into or out of the city. The wall and gate are now badly eroded, but the calculation of the height from the width of the doorway and fallen portions of the wall

An artist's conception of Mount E Gateway, showing the corbelled drain (after Kenoyer)

An artist's conception of Mount E Gateway, showing the

suggests that it stood between three and four

Mound E, oriented along an east-west axis, is one of the oldest parts of the ancient city

meters high.that grew up on top of an early village settlement. This mound is surrounded by a largeThe top of the gate was

mud-brick wall that was discovered by Wheeler in 1946.

Careful examination of the Harappan wall construction and sampling of sherds found inprobably covered and may have had rooms or

the mortar revealed that it was built up and refaced both inside and outside numerous

other crafts were being produced. They includedlookout posts, which are commonly depicted

seals with graffiti and signs that appear to be pre
The wall made a rough parallelogram about 460 yards by 214 yards, the long axis
cursors to the Indus script. Signs of this type also
extending from north to south. The revetment of the outer wall, initially built with
were scratched onto pottery either before or after
brickbats, was rebuilt later with whole bricks. At a still later date, sections of the
northwest corner were enlarged and strengthened. These repairs must have been carried



Within the wall, as at Mohenjodaro, a great

out at the height of the city's hey days because of the workmanship is of a high order.
the individual pieces were fired. Although some may
represent marks made by potters to identify their

A major gateway was constructed along the south wall at the center of a large curve that mud-brick platform was raised, in places up

wares, others appear to represent an early form of

to 25 feet in height. On this were constructed

script. Some seals were produced with narrative

fired-brickscenes and images of animals. Of particular interestwhose various

is a sealing depicting a so-called unicorn, a com

vicissitudes went through at least six phases.

mon motif found on seals in the Urban period. (See

These buildings have, for identification figure below for examples from the Urban period).
purposes at least, practically vanished, but a

phase at Harappa is the adoption of an agropastoral

drain and a well remain to suggest the same

A massive baked brick revetment wall sur**rounds the solid mud-brick foundation platform of the**
rounds the solid mud-brick foundation plat**"granary" that measures approximately 51 meters**
form of the "granary" that measures approxi**north-south and 41 meters east-west. Based on analysis of**

buildings mately 51 meters north-south and 41 meters

revetment wall, it is possible to date its construction to
east-west. Based on analysis of the pottery **near the end of Harappa Period 3B, between 2300 and**
and other finds from below and against the
2200 BC (HARP)
revetment wall, it is possible to date its con
struction to near the end of Harappa Period economy. Wheat and barley are traditional winter grating
its hinterland as well as obtaining materials

obsession with water as at Mohenjodaro. 3B, between 2300 and 2200 BC

(HARP)crops, most likely diffused from sites like Mehrgarhfrom distant resource areas.

in Baluchistan. The presence of millet, a droughtThe wide variety of raw materials used in resistant crop, usually grown in the summer specialized crafts during the Kot Diji phase indicates months, suggests that farmers were also experi
menting with a year-round cropping system. The

the continued expansion of trade networks that were initiated during the earlier Hakra/Ravi phase. Marine shells were brought from more than 860 kilometers away for ornament manufacturing. Various rocks and minerals were imported over distances of 300 to 1000 kilometers for the production of utilitarian objects such as grinding stones and chipped stone tools as well as for the manufacture of ornaments such as beads and inlay. The use of

similar raw materials from different resource areas,
There is speculations that the Early Indus Harappa of Kot Dijian type also had a raised
parallel with other sites in the Indus Valley at large
such as gray black chert from the Salt Range and

portion of the settlement. Although no clear evidence has so far emerged, the existence where the Early Indus phase butts with the coming tan chert from Sind, indicates a competiof a raised platform would not be surprising: it has been the general practice in the Kot

tive expansion of trade networks andDiji culture in lower Sind.
the increasing importance of exotic
items. The use of raw materials from
these diverse source areas also indi
cates the cultural and technological
integration of Baluchistan, Sind, and
Punjab that was soon to come in full
bloom. At the same time, the absence
of any raw material at Harappa, or
anywhere else, coming from the east of
the Sutlej shows that the region to the
east of Harappa was generally unHarappa and the Northern Towns!

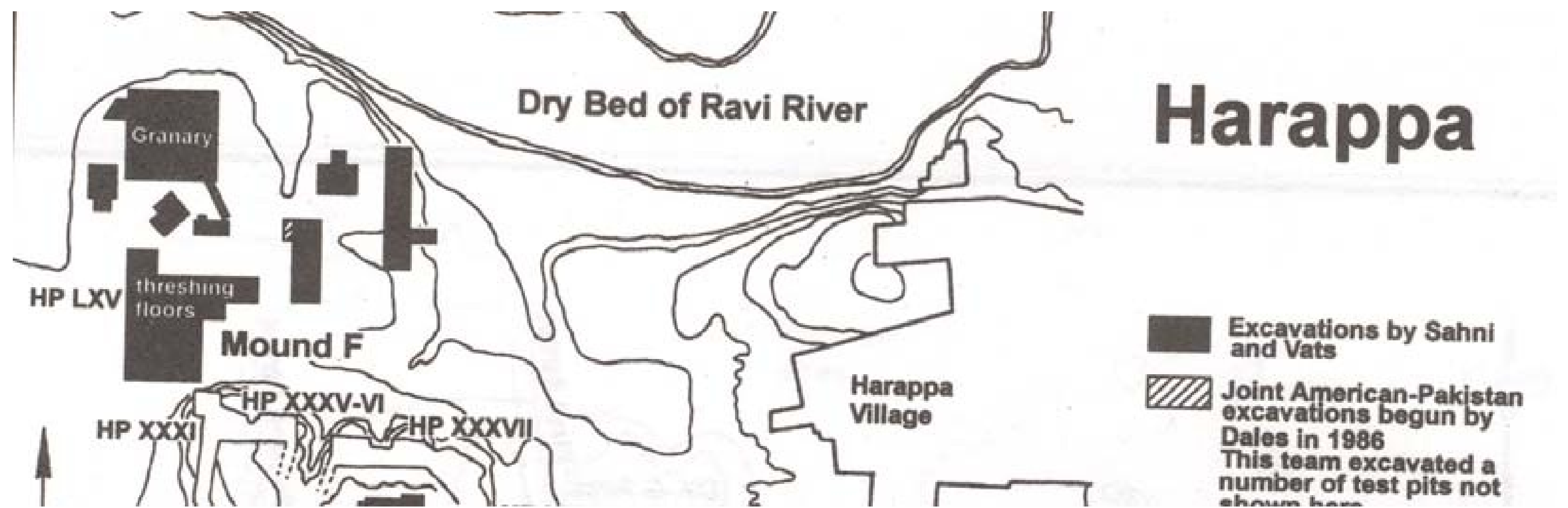
known or at least alien to the Indus

brick structures eroded sufficiently to protect those below. The historic occupation of
people.parts of the site although frequently reusing bricks of the Harappan period, had little
Craft production indicators from
impact but three subsequent developments greatly affected the site. First, the removal
Kot Diji levels show a marked increaseof thousands of bricks for railway ballast in the 1850s destroyed many of the late phases
of occupation; second, the increasing use of irrigation agriculture resulted in gross
in technological complexity and new
salination; third, archaeological excavations exposed structures to the destructive nature

types of finished objects. The produc
of salination. As a result many of the structures exposed and conserved by Wheeler in
tion of glazed steatite beads and seals

the 1940s have been completely destroyed. Harappan Archaeological Research Project, **A public well at Harappa**as well as of faience ornaments reThe foreground well is only one of eight wells, public and private, that have thus far been disunder the direction of Kenoyer and Meadows, have tried to arrest this destruction in
cooperation with the Archaeological Department of Pakistan.
covered at Harappa. Most of the water used by the population probably came from the adjacent Ravi River. The curved wall was probably a large drain used during the latter stages of ancient Harappa, around 2,000 B.C. (after Kenoyer)Harappan phase (see Chapter 5). **Mature Harappan Phase:** This
book entirely pertains to the material
The large open area inside the gateway may have been used as a market or checkpoint culture of the Mature Harappanfor taxing goods, being brought into the city. To the east of the gateway is a large street
Phase of the Indus Civilization, of

leading north into the center of the city, where there is evidence for shell and agate workshops. On the west is another neighborhood that had evidence for copper working. which the city of Harappa is an inteThis gateway was probably used as a means of controlling access into or out of thisgral part. Here we touch upon only a section of the city. few topics that are specific to this



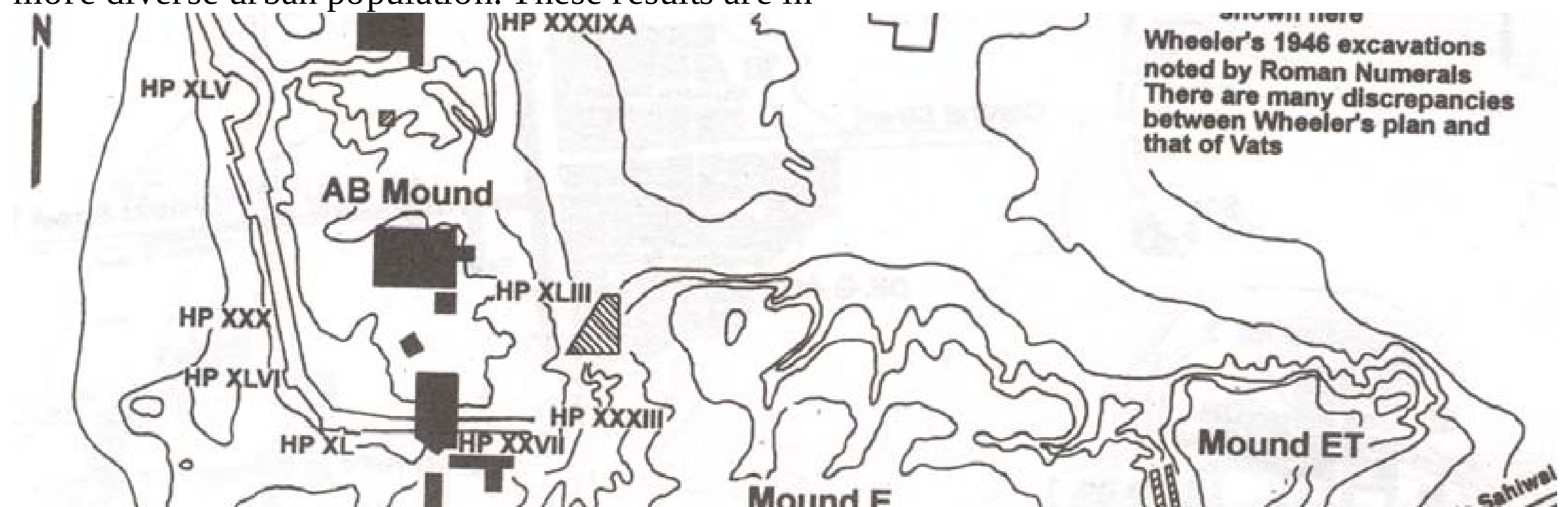
important Indus site before we move

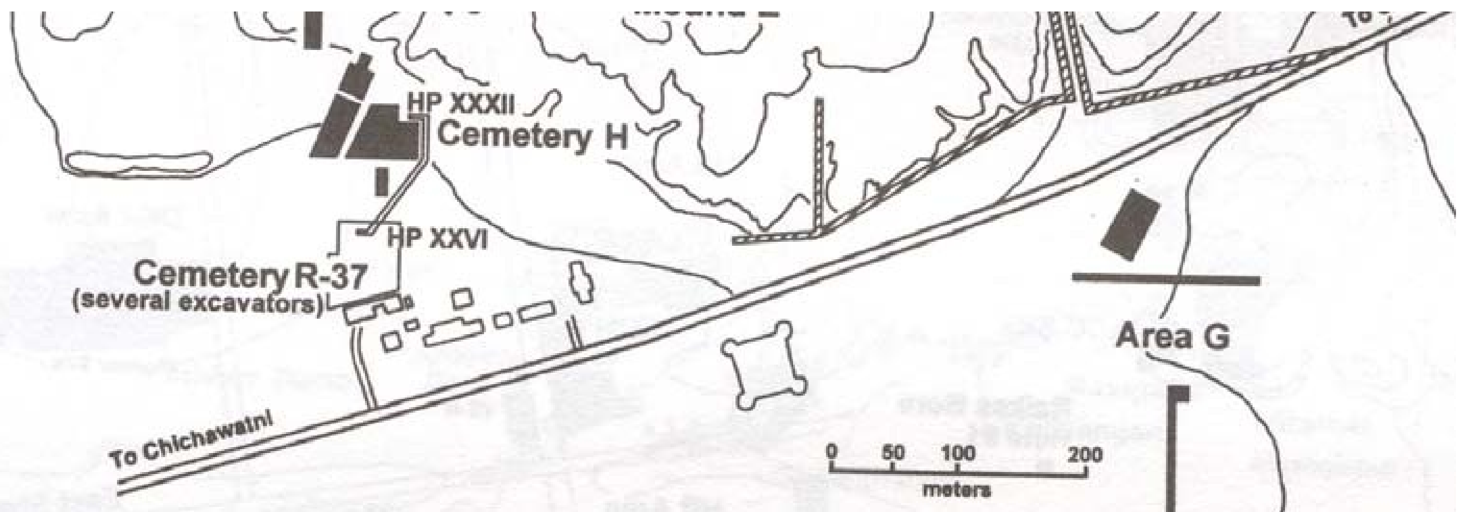
Outside of the city wall and only some 30 meters due south of the gateway is a small mound dating to the Mature Harappan phase, with houses, drains, bathing platforms and on to other cities and towns in the possibly a well. This cluster of houses mayUpper Indus Valley. The details will *caravanserai*, follow. for travelers who were passing by the city or who had arrived after the city gates were closed. In the historical period, *caravansarais* were set up outside of major cities and along the major trade routes to accommodate traders and pastoral **City Planning, Perimeter**

Walls, and Architecture: Contrary relays. Travelers could leave their goods in the rest stop while negotiating taxes or

sulted from the refinements of earlier glazed steatite manufacturing techniques. Precious metals such as copper and gold were also employed for both utilitarian and decorative purposes. Many additional styles of bangles, beads, pottery and utilitarian objects reveal the need for increased variety for a

more diverse urban population. These results are in





Locational map of Harappa, showing various archaeological mounds and excavations (Kenoyer)

Locational map of Harappa, showing various archaeological mounds and excavations (*Kenoyer*)

Page 209 185 to Mohenjo-daro, which is clearly

divided into two portions – one Page 217 Lower Town and one so-called Citadel, Harappa seems to be a collection of several towns or ‘suburbs, spread around a central depression that may have been a large tank or reservoir of water. Made up of numerous mounds extending in a circuit of some three and a half miles, the site arose in places up to sixty feet high. Early reports noted its immensity. Each major mound was apparently surrounded by a massive mud-brick wall, with brick gateways and bastions located at intervals along each face. Mound E, oriented Harappan Civilization - The Material Culture

along an east-west axis, is one of the oldest parts of the ancient city that grew up on top of the early village settlement. This mound is surrounded by a large mud brick wall, which was partly faced with baked brick. A major gateway was constructed along the south wall. At the gateway itself, the mud brick city wall is over 9 m wide and may have had additional bastions making it up to 11 m wide. The gate itself is made of baked brick with one meter thick walls firmly bonded to the mud brick city wall. A small projection on the inner eastern edge of the height of the city’s hey days because of the workmanship is of a high order.

A major gateway was constructed along the south well at the center of a large curve that passed into or out of the city. The wall and gate are now badly eroded, but the calculation of the height from the width of the doorway and fallen portions of the wall suggests that it stood between three and four meters high. The top of the gate was probably covered and may have had rooms or lookout posts, which are commonly depicted in gateways of the



The foreground well is only one of eight wells, public and private, that have thus far been discovered at Harappa. Most of the water used by the population probably came from the adjacent Ravi River. The curved wall was probably a large drain used during the latter stages of ancient Harappa, around 2,000 B.C. (Kenoyer**)**

brick gate (2.8 m wide and perhaps 4 m high) may indicate stairs leading to the top of the wall.

Careful examination of the Harappan wall construction and sampling of sherds found in the mortar revealed that it was built up and refaced both inside and outside numerous times during 700 years of the Harappan phase occupation. It is a ta pering wall, 45 feet wide at its base, and protected by a mud and brick band and a fired-brick revet ment. The wall made a rough parallelogram about 460 yards by 214 yards, the long axis extending from north to south. The revetment of the outer wall, initially built with brickbats, was rebuilt later with whole bricks. At a still later date, sections of the northwest corner were enlarged and strengthened. These repairs must have been carried out at the historical cities. Within the wall, as at Mohenjo-daro, a great mud-brick platform was raised, in places up to 25 feet in height. On this were constructed firedbrick buildings whose various vicissitudes went through at least six phases. These buildings have, for identification purposes at least, practically vanished, but a drain and a well remain to suggest the same obsession with water as at Mohenjo-daro, extends out onto the plain as if to encompass a large market or open space. Based on analysis of the pottery and other finds from below and against the revetment wall, it is possible to date its construction to near the end of Harappa Period 3B, between 2300 and 2200 BC (HARP).

Outside of the city wall and only some 30 meters due south of the gateway is a small mound dating to the Mature Harappan phase, with houses, drains, bathing platforms and possibly a well. This cluster of houses may represent a temporary rest stop or *caravanserai*, for travelers who were passing by the city or who had arrived after the city gates were closed. In the historical period, *caravansarais* were set up outside of major cities and along the major trade routes to accommodate traders and pastoral relays. Travelers could leave their goods in the rest stop while negotiating taxes or trading privileges.

A sequence of four drains, built one after the other, has been found exiting the city at the main gateway between Mound E and Mound ET. Some drains appear to have been provided with wooden sluice gates or perhaps a grill to keep people from secretly entering into the walled city, or used for

trading privileges. protection agains the wild animals. One completely preserved drain has a magnificent corbelled arch result of "a piece of government planning" and as The modern road which runs along the southern edge of the mound past this gateway
that is 1.6 meters high, 60 cm wide and extends for indicative of "ranges of barrack-like quarters withinwas probably first established by Harappan traders 4,500 years ago. The small mound

6.5 meters beneath a major city street. Amongst a walled compound." These, together with theoutside the ancient gateway of Mound E was used during historical times as a

Wheeler's discoveries was a cart-track in the south and a stable for horses used in postal relays between Lahore and Multan. granaries and the "serried lines of platforms for ern cemetery area with some six wheel-ruts still was probably a reused Harappanpounding grain," (see below) plus of course the visible.well, because it was next to an ancient Harappan bathing platform that had beenwalled "citadel," suggest social and political ele

A remarkable group of buildings is found just north of the walled platform. These are essentially a series of well-planned houses probably once surrounded by a compound wall. At least fourteen houses are indicated, running in two east-west lines of seven houses each. A narrow lane divided one row from the others, the northern row opening on the lane and the back of the southern row of dwellings. Each house was rectangular and measured approximately 55 by 24 feet. One entered at one short end through an oblique passageway into a long room, or more probably a court, some 23 by 20t feet in size, beyond which was a small room. Brick paving apparently was much used in these houses, as with most structures of the Harappan Civilization. The houses, though in lines, were separated, and no sharing of a common house wall is indicated. Wheeler sees these structures as the

repaired and reused by the travelers of historical *caravanserai* thousands of years later.


A public well at Harappa

The foreground well is only one of eight wells, public and private, that have thus far been discovered at Harappa. Most of the water used by the population probably came from the adjacent Ravi River. The curved wall was probably a large

There is an imposing high area on the west, surrounded by substantial brick walls. It is
drain used during the latter stages of ancient Harappa, around 2,000 B.C.

generally called Mound A-B. Wheeler labeled it a "citadel," just like the Mound of the ***(Kenoyer*)**
Great Bath at Mohenjodaro. Wheeler's work on the enclosure walls indicated that the main entrance was on the north but that on the western side a bastion overlooked a

ments of significance to an understanding of the Harappan Civilization.
Harappan cities are known for their straight and wide streets as well as for the drains which were regularly cleaned and maintained. In the case of Harappa, Kenoyer has made an interesting observation: there were periods when the city drains did not get cleaned, causing them throughout the city to become totally clogged. Sewage apparently ran along a general the street until hundred years once again took control of the situation and built new drains directly above the old ones. **Granary and Grain Pounding Platforms: :** To the north of A-B mound and between it and the old riverbed the excavators found a series of remains of much importance. The first of these to note are Wheeler's “granaries”. These are closest to the river depression in

finally, fifty to later, the city
The different mounds or walled hoods
at
or stairs to the platform.
Harappa were established at
times as the city grew, but they all were inhabited by
The structures inside the western mound are much too destroyed for any worthwhile the east and west sides of the structure, indicates people who shared the same culture. Characteristic
excavation results, and the excavations at the site between 1920-21 and 1933-34 and in
styles of painted ceramics, clay figurines, inscribed that the granaries faced toward the river and thus 1946 were mainly focused on the buildings between the western mound and the bed of
seals and ornaments have been recovered from all could be supplied by river transport. The granaries the Ravi and on the cemeteries to the south of this mound. The evidence of habitation in

of the excavated mounds, and there is evidence for proper were set on a pounded-earth platform about

the eastern mound is still not very sharp, but the traces of small streets, drains and soak
the movement of goods from one sector to the
other. However, it still is not clear why the different

mounds continued to be walled or how they were

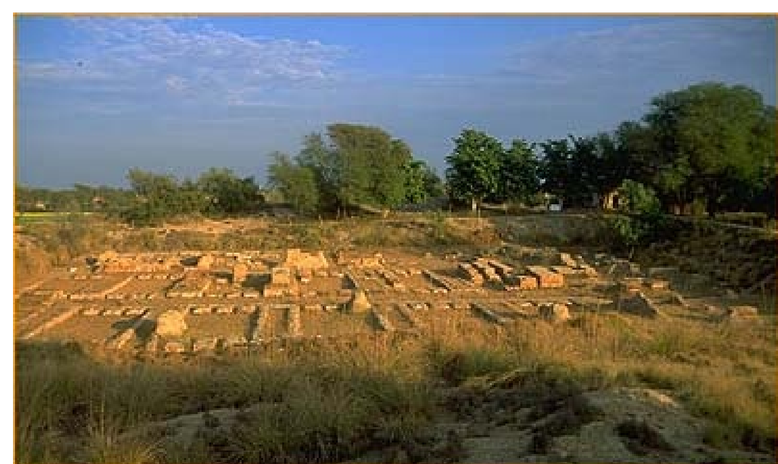
politically united into a single city.
4 feet high. The granaries appear to have been a bit more elaborate than their equivalent at Mohenjodaro. A central aisle ran between two large units composed of six granaries each. These measured

neighborseries of ramps and terraces which led through gates till a final rise by means of a ramp

different
bed, and in fact Wheeler feels that a revetment found on the southern end, plus the lack of space to
wooden floors apparently, and the spaces between each unit were in effect the air
passages to provide necessary circulation. Stairways in the central circle and ramps
along the sides gave access to the storage area, which, according to the original
excavator's report, had doorways both at one end and on the two long sides. Wheeler Harappan Civilization - The Material Culture

he hoped

During his *(ca*. 9000 square feet) is quite close to that



Granary at Harappa', and mentioned his visit to the 'Roman wall this summer' where the 'resemblance of one of these . . to the Harappa. Granary, was striking". Similarly, Wheeler, through comparisons with similar structures in Crete and Rome, and not through any relevant finds within the premises, vividly described them as civic granaries. These are flimsy argument, to say the least. Consequently, the concept of granaries, as it applies to these ruins, is presently being dismissed by some contemporary excavators although the name is still retained in

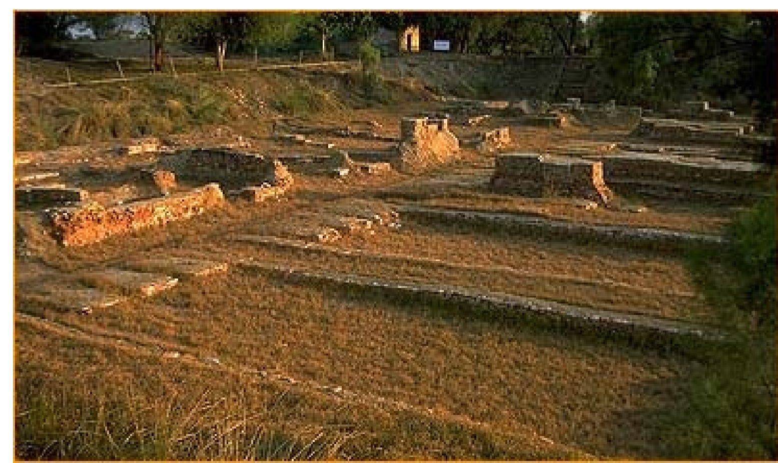
Harappa and the Northern Towns!
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forts
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at
although the name is still retained in popular literature.



About one hundred yards tothe the south of the granaries are a one of
series of brick circles arranged

Different views of the 'granaries' at Harappa

Different views of the 'granaries' at Harappa

in lines. These measure ten to Page 220
eleven feet in diameter. Vats
had identified seventeen of
50 feet by 20 feet respectively and in form consisted
of three narrow parallel brick units and two outer these and Wheeler another of

walls. These provided the foundation for wooden them. The remains of still floors apparently, and the spaces

between each unitanother such brick circles have were in effect the air passages to provide necessary been identified recently by circulation. Stairways in the central circle and ramps Kenoyer and Meadow. The along the sides gave access to the storage area,circles typically have a hole in which, according to the original excavator's report,the center and concentric rings had doorways both at one end and on the two longof edge-on bricks. Wheeler's sides. Wheeler points out that the total floor spacecareful work resulted in the available *(ca*. 9000 square feet) is quite close to

identification of straw in
that available at the Great Granary at Mohenjoassociation with his platforms.
daro. The granary at Harappa seems to have been built late in Period IIIB.Vats had already These structures
found cleaned wheat and husked were firstdiscovered by
Sani in 1921 who reported a building with parallelbarley in the central hole of walls ‘whose purpose and character’ he hoped ‘furanother. Wheeler, reasoning by

ther explorations would determine’. During his furanalogy with similar customs lough in England in 1930, Marshall realized this toelsewhere, be a granary, and saw physical similarities betweenHarappans

this structure and the
horrea
pestles to pound grain in the attached to many Ro

man forts in Britain. In his letter to Vats, who subse"mortar" of the central hole. quently excavated Harappa from 1926 to 1934 andThis is not a far-fetched idea as authored the excavation reports, Marshall wrote thatthe use of large wooden pestles “in some Roman forts in England and Germany there are structures remarkably like the Great feels that the

used wooden



Between Mount AB and F are a number of mysterious
To the south of the "granary" or "great hall" at Harappa

circular platform, originally inside houses and small **is an area with numerous circular working platforms that** courtyards. These platforms are often called workmen's **were built inside small rooms or courtyards. These circu**

platforms, and were first thought to have been used to
lar working platforms may have been used for husking
thresh grain for what was also thought to have been the
grain. One of these circular platforms had what may have been a large wooden mortar placed in the center Page 221

About one hundred yards to the south of the granaries are a series of brick circles arranged in lines. These measure ten to eleven feet in diameter. Vats had identified seventeen of these and Wheeler another of them. The remains of still another such brick circles have been identified recently by Ke

Another group pf beads from Harappa. A diverse choice of stone is evident. Some of these stones were procured from long distances
barley in the central hole of another. Wheeler, rea
soning by analogy with similar customs elsewhere, feels that the Harappans used wooden pestles to
Harappa and the Northern Towns!




A terracotta chicken from Harappa
A terracotta chicken from Harappa

were being employed for lapidary work, shell working was present but not in profusion, copper tools Another group pf beads from Harappa. A diverse choice of stone is evident. Some of these were being made, and the making stones were procured from long distances of steatite seals, chert weights,

pound grain in the "mortar" of the central hole. This

particularly technological stages ofis not a far-fetched idea as the use of large wooden

pestles and mortars for husking of grain has been

production, and published their results in

quite common in Punjab until very recent times.

quite common in Punjab until very recent times. **Metal and Terracotta Objects, Pottery, and**
280) under

other Artifacts: The Excavations at Harappa have

Trade and Technology of the

yield a large variety of metal and terracotta objects.

Indus Valley: New Insights from Harappa,

The number of pottery pieces and pottery sherds

Pakistan. **They do not report any art and have been really large, so is the number**

of seals

and inscribed tablets. Because of their relevance to

craft, or indicate any specific production

the Harappan Civilization in general, they have

techniques that have not been reported

been dealt with elsewhere in related chapters on

earlier at other locations. Bead making the material culture of this civilization. Suffice here

to say that most of the artifacts and steatite seals at

industry is evident in Period 1 (3300-2600

Harappa are very similar, in fact identical, to those

BC) onward, both hard and soft stones

found at Mohenjodaro and elsewhere.

Cemeteries: There are two cemeteries at Harappa designated R-37 and H. They are located in the same general part of the site. The one designated R-37 is the largest Mature Harappan cemetery known to us. The dead in this place were treated in a variety of ways. Some skeletons have been found in an extended, supine position inside wooden coffins, the way many contemporary Pakinoyer and Meadow. The circles typically have a hole in the center and concentric rings of edge-on bricks. Wheeler's careful work resulted in the identification of straw in association with his platforms. Vats had already found cleaned wheat and husked

objects is in the city.
concentrated in do

and carved ivory objects is in evidence

particularly

throughout
the
technological city.stages of There is evidence that certainproduction, and published their results in trades werewerein280) under concentrated specific areas, just as they do *Trade and Technology of the*


Indus Valley: New Insights from Harappa,

presently in almost all cities of



Pakistan. They do not report any art and



Examples of drinking goblets from Harappa**Tiger or leopard figurine with incised facial features,**
craft, or indicate any specific production
including punctated dots on the face that could be
techniques that have not been reported Page 223**whisker marks. This figurine depicts a normal feline**
earlier at other locations. Bead making
without horns or human face and therefore probably
represents the actual wild animal. Hand formed withindustry is evident in Period 1 (3300-2600
applique eyes.
BC) onward, both hard and soft stones


A burial at Harappa with grave goods
Examples of drinking goblets from Harappa
Examples of drinking goblets from Harappa
Page 223

stanis are buried.. In the large number of Harappanperiod graves that have been excavated in R-37, bodies were mostly laid on one side, and an average of fifteen to twenty pots containing provisions for the afterlife were buried with the dead. Stone and bronze ornaments adorned the person but never in profusion. A significant number of graves contained bronze mirrors. A few graves contained wooden coffins and/or reed shrouds, which was a Mesopotamian practice. Cemetery H is a burial ground for Late-aHrappan period and contains pot burials and a variety of other interments in the earth (fractional, dismembered, and so forth). Cemetry H occupies a special place in Harappan archaeology as it indicates a clear cultural break. These burials are associated with non-Harappan

people, probably the immigrant or invading peoples from the west. Since this period belongs to the tail end of the Indus Civilization or a post-Harappan culture, it will be treated in the next volume of this work.

OTHER CITIES AND TOWNS

Ganweriwala: A newly reported site called Ganweriwala at more than 100 hectares is within the range of northern Harappan cities. It is essentially identical in size to Mohenjo-daro and probably larger than Harappa. The location of this Harappan city just to the southeast of Panjnand and about 27 kilometers south-west of Fort Derawar is on the edge of the Hakra flood plain, in Bhawalpur District and precisely midway between Mohenjo-daro and Harappa. Ganweriwala would thus seem to figure prominently in the Harappan urban geography, not only as an intermediate settlement between the two classic city sites, but as a place through which the Harappans may have been drawing on the agricultural resources in the region. It consists of two closely-situated mounds, measuring 500 by 530 meters and 500 by 300 meters, respectively, with a maximum height of eight meters. Collectively, both the mounds cover an area of about 80 to 100 hectares, which is approximately 25 to 50 hectares less than the total area occupied by the city and the citadel of Mohenjo-daro. In comparison, Harappa sprawls over 65 hectares excluding the cemeteries and therefore, it is about 15 hectares smaller in size than Ganweriwala. No other northern city comes close in size to this site: Kalibangan being 18 hectares in overall size, is no match to it because it is more than 4 times smaller than Ganweriwala.

In terms of locational geography it is perfectly situated within the Mature Harappan settlement grid. The town's remains lie near the southern edge of a cluster of Mature Harappan sites, believed to be in excess of 170. There are other habitation sites, camp sites, and sites with remains of kilns for the production of brick, around Ganweriwala. The lower Hakra stretch is blessed with a rich reservoir of subsoil water. Several medieval forts mark the location of perennial wells to which mobile pastoralists take their cattle. Ground water would have made up for the deficit in rainfall (on average 12 - 20 centimeters per year).

The site of Ganweriwala has not yet been excavated but some exploratory work has recently begun. For example, a combined team of the American, Japanese, and Pakistani archaeologists has recently (2007) claimed the discovery of some Mature Harappan objects in this area. According to press reports, they have found a rare copper seal, a terracotta tablet, three wedge-shaped bricks, pottery with distinct potter marks and four unicorn tery with distinct potter marks and four unicorn 2500 B.C; the terracotta tablet with three pictographs on one side and a 'yogi' on the other side make the entire complex very interesting from iconographical point of view; the four unicorn seals found here are slightly idfferent from those found at Harappa. The mound of Ganwariwala is replete with potsherds showing striking affinities with the pottery known from the various Indus Valley sites. A preliminary survey shows the streets to be cutting each other on right angles, which is considered to be a hallmark of the Harappan town planning. However, nothing has yet been published beyond a few journalistic writeups in local newspapers. Given these preliminary results and given the extraordinary large size of this site, the excavation at Ganweriwal can be anticipated as one of the truly rewarding experiences in Harappan archaeology. The site assumes special significance when a large city of the fully urbanized stage of the Indus Civilization is placed amidst contemporary settlement sites, industrial centers and camp sites, thereby demonstrating various parts of an integrative system not yet discovered anywhere else in the greater Indus valley.

Kalibangan: Kalibangan, so named because of the countless sherds of dark t e r r a c o t t a b a n g l e s strewn on the surface of its two mounds, is on the left bank of the Ghaggar, known in Pakistan as Hakra. The site was discovered by Luigi Pio Tessitori, an Italian Indologist (1887–1919) who was doing search in ancient dian texts. At that time Archaeological Survey of India had some excavations going at









A pit with chared animal bones at Kalibangan. Some would have us believe that it was a 'fire altar'

business quarters. A main thoroughfare over seven meters in width ran through the middle of the site. The houses were the usual rooms around a courtyard. Drains, a well, stairway, etc. are all familiar features. The waste water from the

reIn

houses emptied into jars outside: there were no drains along the road, owing presumably to the extreme dry climate of the place. The houses generally were of the Indus style, their various parts ranged around courtyards.

There are some important differences too and some of these differences between Kalibangan and the mainstream sites in Sind and Central Chanhudaro, Judeirjo-daro, Lohumjo-darp, to name but a few - may be of significance. For, whereas the other ‘cities’



named were constructed largely of burnt brick, Kalibangan

was mainly of mud brick construction. Some use of burnt brick there certainly was but the comparative rarity of it suggests the possibility that the means of producing large quantities of burnt brick did not match the knowledge of how to do so. In other words, it suggests a possible lack of sufficient number of brick-making artisans or abundant fuel. If we consider Kalibangan as a peripheral Indus town, these differences are not at all surprising.

Seals and sealings from
A few seals from
Kalibangan
Kalibangan

A significant number of Indus stamp seals and sealings were found at Kalibangan, including examples of both unicorn and zebu motifs. The important finds at Kalibangan include an inscription scratched on a pot with one sign cutting another in such a way that it is clear that the writing is from right to left.

An interesting find was seven oval or rectangular fireplaces built in a row on top of one

Harappa, but the results had not yet reveled the The early settlement was abandoned and existence of an urban civilization in the Indus Valley. Kalibangan of Mature Indus was entirely rebuilt on The true nature of the site, therefore, remained hidtop of this pre-Indus settlement. When the Indus den beyond its identification as pre-Maureen setpeople reoccupied Kalibangan, their ceramics intlement. After the Partition, A. Ghosh of the Survey

cluded many of the shapes and fabrics of the Period
of the platforms, mentioned earlier. These fireplaces were sunk into the floor, plastered of India marked it out for excavations. Subse
I occupation. This lasted for about one-half of Pe

with clay and contained a cylindrical and faceted clay stump and terracotta 'cakes' quently, Kalibangan was

excavated by B.B.Lal and riod II, when it gave way to a more purely Harappan associated with ash and charcoal. There were a few bath-pavements and a well near B.K.Thapar for a number of years, though no report ceramic corpus. Other sites in this region also share these fireplaces. These fireplaces have been taken as ‘fire-alters’ by some of the Indian has seen the light of the day so far beyond some this mixture of ceramics as seen at Kalibangan.

archaeologists, obviously connecting the Agni (fire) worship of classical Hinduism to anecdotal accounts and highly hypered descriptions In Period II the structural pattern of the set

of a "major Harappan" site. The following account of
the Harappan antiquity. Other archaeologists, however, dispute this speculation and tlement was changed. There were now two distinct connect this fired block of bricks and terracotta cakes to the well-known practice of the site is based mainly on Thapar (20) on Period 1 parts: the Citadel on the west, represented by a (the pre-urban phase) and that of a belated report
heating the sleeping space still practiced in some areas of Baluchistan, NWFP and even
smaller mound (KLB-I); and the lower city towards
(34 years after the completion of the excavation),
Pothowar. Other archaeologists consider them as simple hearths, probably community
the east, represented by a fairly extensive mound
again on Period 1 (21). What we know about this
hearths. The cylindrical clay stumps found in some of these fire places do not signify
(KLB-2).The former was situated atop the remains
settlement and the settlements like this is from stray
linga as some of the Indian archaeologists have us believe; they seem to be mere bottom
of the preceding occupation (Period I) to gain an

and piecemeal report
ing, produced in the
heat of Indian national
-supports for larger cooking pots still used in some remote corners of the NWFP and

Harappa and the Northern Towns!

ism. Given the misin Harappan archaeology. The site assumes special significance when a large city of the sionary zeal of the exfully urbanized stage of the Indus Civilization is placed amidst contemporary settlement cavators and their unsites, industrial centers and camp sites, thereby demonstrating various parts of an questioning followers,integrative system not yet discovered anywhere else in the greater Indus valley.the reader must, there



fore, be on guard as to

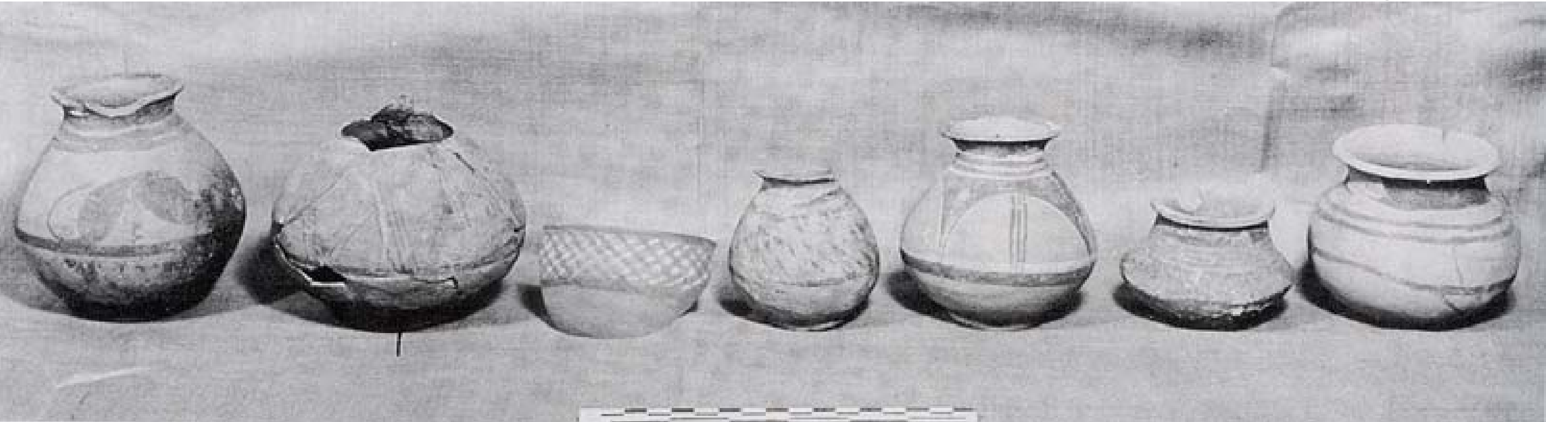


the veracity of the
finds, the soundness of
analyses and the
claimed or perceived
relationship with the

Kalibangan

Kalibangan, so named because of the countless sherds of dark terracotta bangles strewn on the surface of its two mounds, is

Harappa and the Northern Towns !on the left bank of the Ghaggar. Excavated core area of Indus Civilization.A cylindrical seal and its impression from between 1960-61 and 1968-69, the site Kalibangan



in Harappan archaeology. The site assumes special significance when a large city of the
said to have a Sothiwestern mound and the larger eastern mound with an open space between them - and a Siswalfully urbanized stage of the Indus Civilization is placed amidst contemporary settlement

neath the Mature Indus
burial ground to the west-south-west of the western mound. The western fortified

enclosure sites, industrial centers and camp sites, thereby demonstrating various parts of an occupation. However, Pottery from Kalibangan I Pottery from Kalibangan I *(Archaelogical Survey of India*)this pre-Harappan culwas partitioned into two units by an inner wall with stairways on either side for integrative system not yet discovered anywhere else in the greater Indus valley.

movement between the two units. The southern unit had, on its south, a series of steps
fronting
Afghanistan. Although the claims of fire and *linga* worship have been made, full

the fortification wall Kalibangan by some interested which was excavation report is not yet available and repeated attempts

provided with a archaeologists for clearer photographs and detailed description have failed so far. passage across it at this point.
Otherwise,
this
unit
Of great significance is the discovery of the surface of a field ploughed in two sets of

contained Kalibangan, so named because of the

several
mud-brick
platforms,
furrows at right angles to each other. The field lies outside (southwest of) the town wall.

countless sherds of dark terracotta bangles

possibly with structures on them. Traced across an area of about 140 meters square, it lies under a layer of silt

that in its 

turn was covered by strata with Harappan material. This is offered as a clear evidencestrewn on the surface of its two mounds, is

Kalibangan has been extensively that the plough was in use before the Mature Harappan period. It may be so, but the

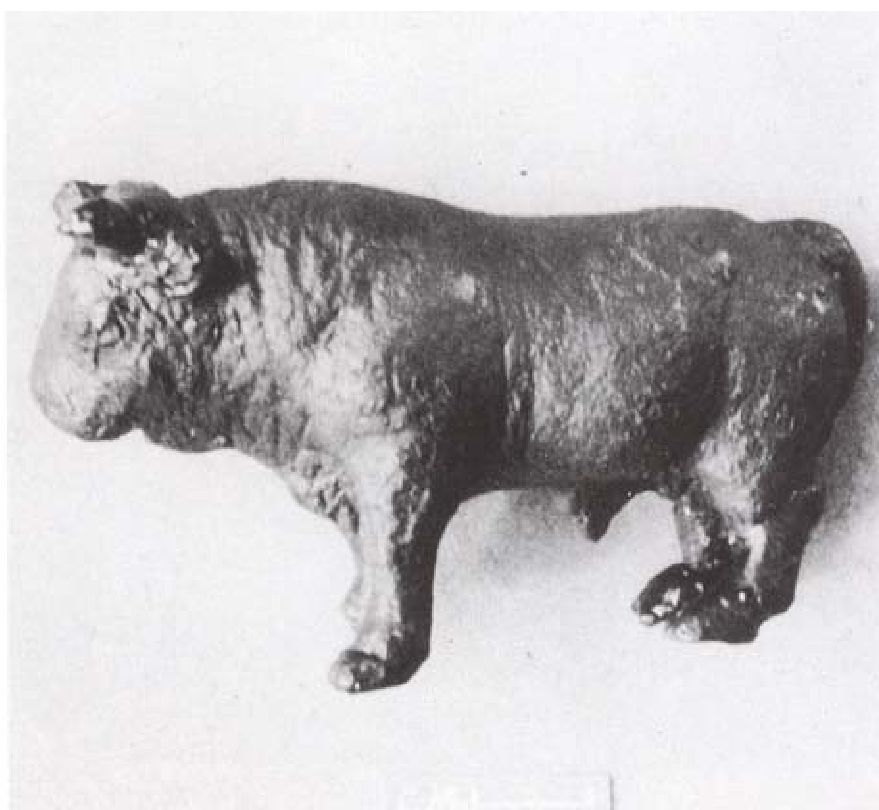
A cylindrical seal and its impression from Kalibangan on the left bank of the Ghaggar. Excavated A cylindrical seal and its impression from but not properlyexistence of extremely regular and narrow furrows and exactly right angle cross-furrows excavated between 1960-61 the site Kalibanganreported. What we know aboutof modern type raises a question mark. Here too, no archaeological details are available. and 1968-69,
this urban settlement and the Kalibangan is said to have a Sothi-Siswal settlement beneath the Maturecomprises of two mounds - the smallerIndusture has been found only at the lower levels of the
western mound.western mound and the larger eastern mound with an open space between them - and a

rounded by a wall approximately 250 by 170 meters which Page 228

in extent. The first phase of the wall was made ofhave not been peer-reviewed. burial ground to the west-south-west of the western mound. The western fortified enclosure *(c.*

mud bricks laid to a thickness of approximately 1.90

Given the missionary zeal of the240 x c. 120 m; 3 to 7 m wide and with rectangular salients and towers)meters. A second phase of construction brought the excavators and theirwas partitioned into two units by an inner wall with stairways on either side for thickness of this wall up to 3 or 4 meters, varyingthe



from place to place. The inner and outer faces ofunquestioning followers,
reader must be on guard as to the

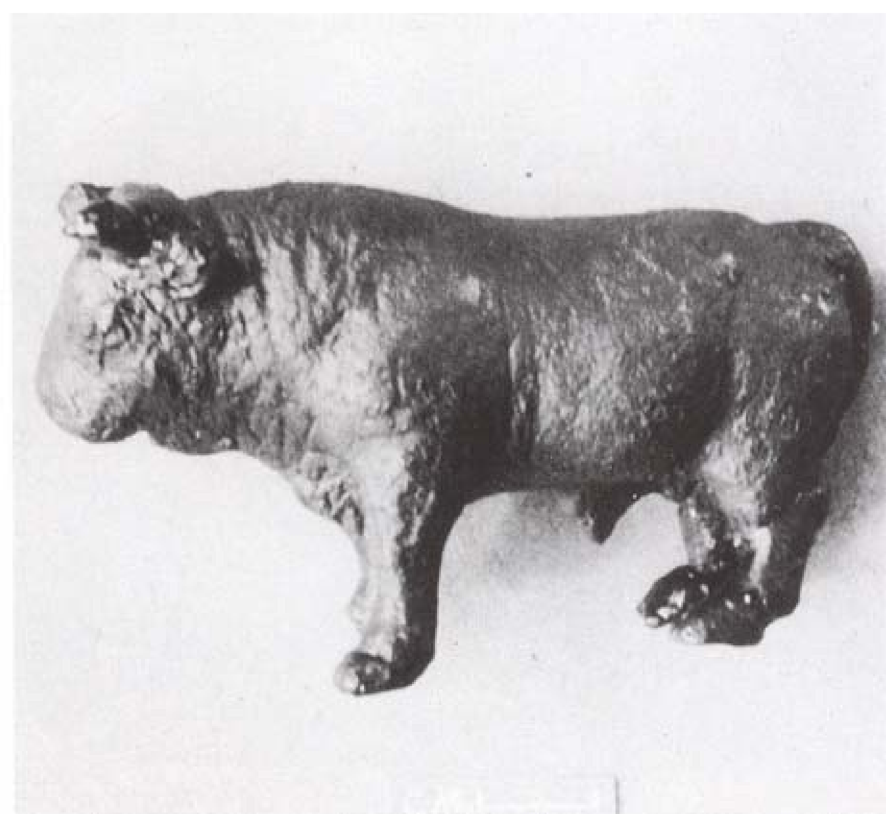
the "fortifications" were plastered with mud. Only movement between the two units. The southern unit had, on its south, a series of steps

one entrance, at the northwest corner, was exca

fronting the

vated; other entrances were probably obscured by

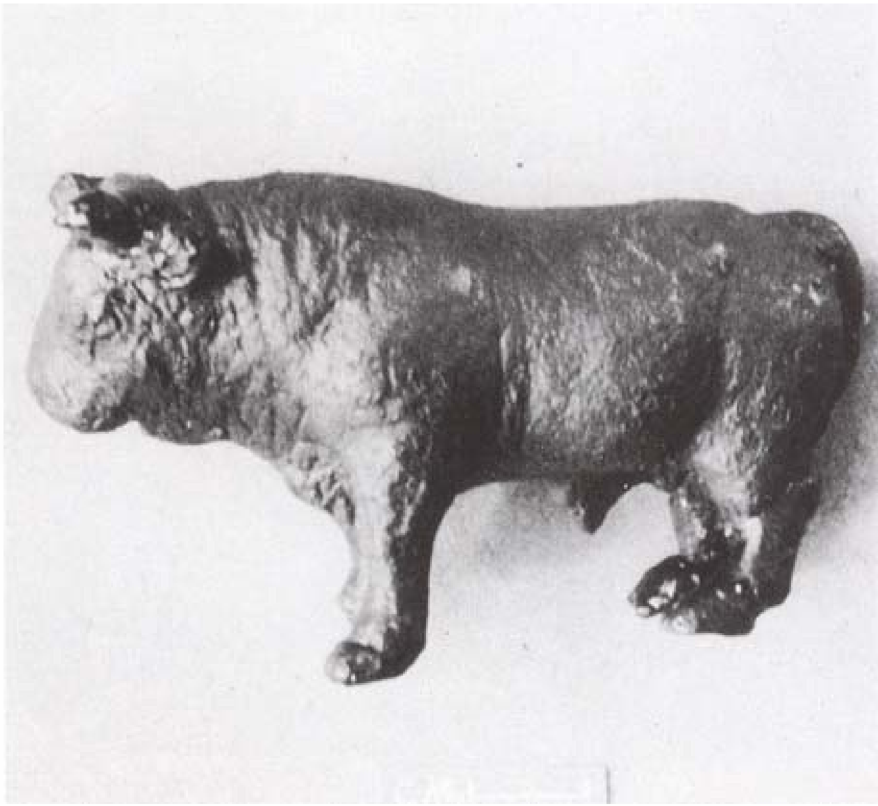
which was later Harappans.
veracityfortification the wall finds, the provided soundness of analyses and a the with



A bull from Kalibangan in bronze (*after Thapar*)A bull from Kalibangan in bronze (after Thapar)

passage across it at thiswith the Indus Civilization. point.
Otherwise, this unit contained

claimed or perceived relationship



several

From whatever we know about Kalibangan, the city has many things in common with

mud-brick platforms,‘mainstream’ sites such as Mohenjodaro, Harappa, and Chanhu-daro, including virtually

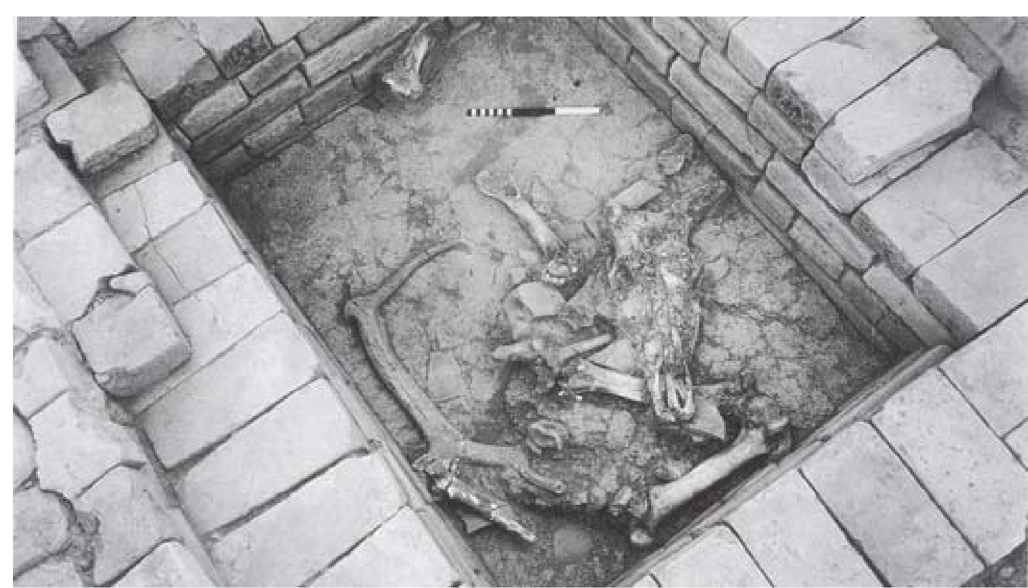
eminence over the lower city which was laid out on the natural plain towards the east, leaving a gap of over 40 m.

The Citadel complex is roughly a parallelogram 240 m from north to south and 120 m from east to west and consists of two almost equal but separately patterned parts, rhomboid on plan. Both these parts were contained by a fortification wall 3 to 7 m in width (on the southern sides, the width was extended from 9 to 11 m) and reinforced at regular intervals with rectangular salients or bastions. The fortifications were built throughout of mud bricks; two sizes of bricks, 40x20x10 cm and 30x15x.5cm (ratio: 4:2:'1), representing two principal structural phases, were used in the construction, the larger bricks in the earlier phase and smaller in

Harappa and the Northern Towns!

The excavations established the existence of four arterial thoroughfares, running north to south and three running east to west. While the former were found to run unimpeded, the latter did not cross the former but were staggered on plan and possibly served as delivery or entrance lanes for certain house blocks. Again, while the former were not equally spaced, the latter were situated on an average of 7 m from each other. Besides, there were quite a few other streets, which served only one or two blocks and were not thoroughfares. The width ranged from 1.8 to 7.2 m. To avoid damage from the vehicular traffic,fender posts were provided at some street corners. The width of the thoroughfares

seems to have been maintained throughout the occupation; the only structural encroachments into the streets were the rectangular platforms (of


A pit with charred animal bones at Kalibangan. Some would have us believe that it

A pit with chared animal bones at Kalibangan. Some would
was a ‘fire altar’
have us believe that it was a ‘fire altar’

The southern half of the Citadel was more
uncertain use) Immediately outside some houses. The streets, except in the late phase, were not paved. House drains, which were either of wood or of baked brick, discharged into soakage jars buried under the street floor.

From the very beginning of the occupation, the houses were built of mud bricks (30 x 15 x 7.5 cm), the use of baked brick (of the same size and also the wedge-shaped type) being confined mostly to drains, wells, sills and bathing platforms. In the typical chessboard plan of the city, each house faced two, if not three, streets and consisted of a courtyard with six to seven rooms aligned on two or three sides. Entrance to the house,

heavily fortified not only with corner bastions but located usually on the lane side, was either through

business quarters. A main thoroughfare over seven meters ina courtyard or through a corridor running between also with rectangular salients along the northern sets of rooms. The finds obtained from the occupawidth ran through the middle of the site. The houses were tion of Period II were all characteristic of the Indus some five to six massive platforms of mud bricks Civilization and need not be listed individually. Thethe usual rooms around a courtyard. Drains, a well, stairway,
(40 x 20 x 10 cm for the earlier phase and 30 x 15 x following finds deserve special mention: a cylinder etc. are all familiar features. The waste water from the seal; a terracotta cake, incised on the obverse withand intended to be used perhaps for a

specific pura horned human figure and on the reverse with ahouses emptied into jars outside: there were no drains along
pose by the community as a whole. All these plathuman figure pulling a sacrificial animal; a terracottathe road, owing presumably to the extreme dry climate of thehuman head; a copper bull showing the dynamic rections. In the case of the fully exposed platform,
place. The houses generally were of the Indus style, theirmood of the animal and other copper objects includ

the longer axis was east-west, for the remaining

various parts ranged around courtyards.three it was north- south. The size of the platforms

no less than the width of the passages separating
them varied. At no point, however, were these plat
ing a pin; a terracotta feeding-cup with a cow's head on the rim; a terracotta graduated scale (incomplete) and an ivory comb. Both wheat and barley

There are some important differences too and some of thesewere found in the deposits of this period. No evi
forms joined to or were integral with the fortificadence of rice was obtained.differences between Kalibangan and the mainstream sites inFrom whatever we know about Kalibangan,Sind was by means of steps, which rose from the pas
and Central Punjab Mohenjodaro, Harappa, the city has many things in common with 'mainsage. Through the passages also ran baked-brick -
Chanhudaro, Judeirjo-daro, Lohumjo-darp, to name but a stream' sites such as Mohenjo-daro, Harappa, and

platforms, no intelligible plans are available as they Chanhu-daro, including virtually the whole reper

few - may be of significance. For, whereas the other 'cities'toire of pottery, flint industry, carved seals, figurines had been obscured by depredations of brick roband the like as well as an apparent division into twonamed were constructed largely of burnt brick, Kalibangan was mainly of mud brick construction. Some use of burnt brick there certainly was but the comparative rarity of it suggests the possibility that the means of producing large

(after Bisht) existence

meters in extent. The first phase of the wall was made of mud bricks laid to a thickness **of approximately 1.90 meters. A second phase of construction brought the thickness of** **Bananwali but they are not vouched for by the local folk. Neither does R.S.Bisht, the this wall up to 3 or 4 meters, varying from place to place. The inner and outer faces of**

well-defined areas: a western small area, tentatively

the "fortifications" were plastered with mud. Only one entrance, at the northwest corner,

identified as the citadel; and a larger eastern area

was excavated; other entrances were probably obscured by later Harappans. The early

A main thoroughfare over seven meters in width ran

settlement was abandoned and Kalibangan of Mature Indus was entirely rebuilt on top

through the middle of the site. The houses were the

of this pre-Indus settlement. When the Indus peoples reoccupied Kalibangan, their

stairway, etc. are all familiar features. The waste

ceramics included many of the shapes and fabrics of the Period I occupation. This lasted

water from the houses emptied into jars outside:

for about one-half of Period II, when it gave way to a more purely Harappan ceramic

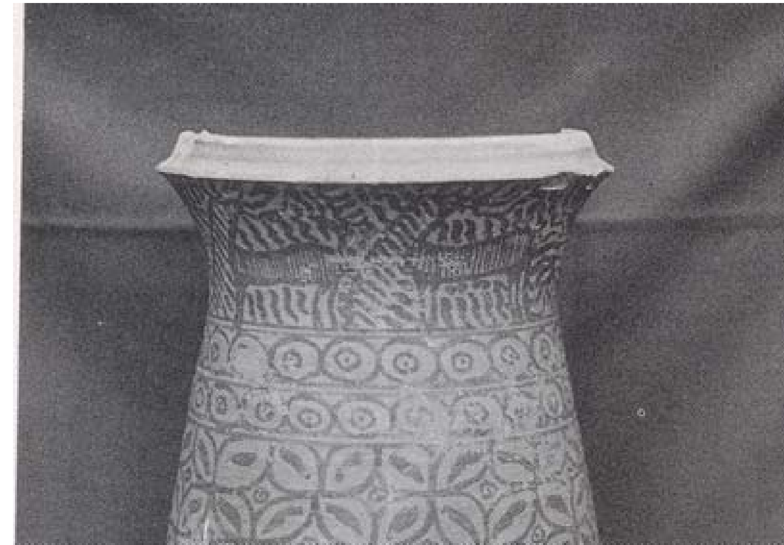
sumably to the extreme dry climate of the place.

corpus. Other sites in the northeastern region of the Indus Civilization share this mixture

The houses generally were of the Indus style, their

of ceramics as seen at Kalibangan. In Mughal's opinion, the pre-Harappan ceramic at

excavator of the site, vouches for twin cant number of Indus stamp seals and sealings



Kalibangan and other related sites seems to be more like Kot Dijian than any 'Sothi

were found at Kalibangan, including examples of

Siswal' type culture. If it is true, then lower level of Kalibangan could be easily

Kalibangan include an inscription scratched on a

considered as the extension of the Early Indus culture of Kot Dijian type, transforming

pot with one sign cutting another in such a way that

into the Indus Civilization from the very beginning. excavator of the site, vouches for twin mounds. therefore, a single-mound settlement, an unusual situation for a Harappan site. Bisht excavated it for four seasons during 1974-77. revealed: Pre-Indus (not the Early Indus), Harappan, and post-Harappan. There are no signs of developing any Indus traits before the appearance of the Harappan features. Instead, it appears that the Harappan culture arrived here full-blown. This includes architecture, weights, clay figurines and miscellaneous tools. The tradition Harappan frequency. Excavations have indicated that the entire Harappan town at Bananwali was securely enclosed by massive defenses, the eastern arm of which has already been determined for a length of nearly one hundred meters

no signs of developing any Indus traits An interesting find was seven oval or before the appearance of the Harappan

Banawali

rectangular fireplaces built in a row on top of one of the platforms, mentioned earlier. These fireplaces
This includes its town-planning and

architecture, ceramics,were sunk into the floor, plastered with clay and weights, clay figurines and miscellaneous
contained a cylindrical and faceted clay stump andtools. The older pre-Indus ceramic
terracotta 'cakes' associated with ash and charcoal. Harappan period but in reducedThere were a few bath-pavements and a well near frequency.

these fireplaces. These fireplaces have been taken Excavations have indicated that the entire
as ‘fire-alters’ by some of the Indian archaeologists,

enclosed by massive defenses, the eastern arm of which has already been determined for a length of nearly one hundred meters

of a ‘fortified
baked and sun-dried, were



obviously connecting the Agni (fire) worship classical Hinduism the Harappan antiquity. Other archaeologists, however, dispute this speculation and connect this fired block of bricks



and terracotta cakes to the well-known practice


A unicorn seal from Bananwali (after Bisht)

Page 230 **A unicorn seal from Bananwali (after Bisht)**

of heating the sleeping space still practiced in some areas of Baluchistan, the Pashtun country and even Pothwar. Other archaeologists consider them as simple hearths, p r o b a b l y c o m m u n i t y of to

hearths. The cylindrical clay stumps found in some of these fire places do not signify *linga* as some of the Indian archaeologists have us believe; they seem to be mere bottom -supports for larger cooking pots still used in some remote corners of Punjab.



Of great significance is the discovery of the surface of a field ploughed in two sets of furrows at Four successive building phases of a house atright angles to each other. The field lies outside (southwest of) the town wall. Traced across an area

Bananwali (after Bisht)
of about 140 meters square, it lies under a layer of
silt that in its turn was covered by strata with Harappan material. This is offered as a clear evi

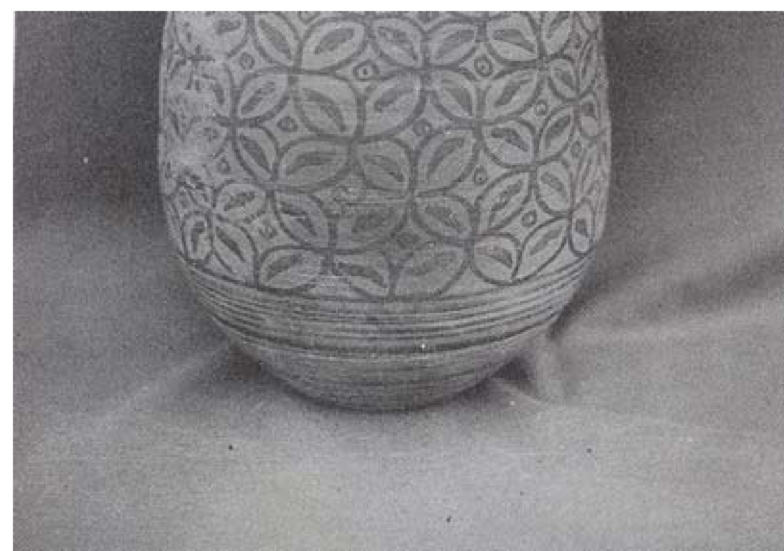
the surrounding area. Suraj Bhan, an acclaimed

Harappan period. It may be so, but the existence of

archaeologist of India, reported twin mounds at

extremely regular and narrow furrows and exactly right angle cross-furrows of modern type raises a

Banawali in Hissar District of Haryana in India is probably the easternmost settlement of the Harappans in the Indo-Gangetic divide. It is about 120 miles from Kalibangan and about 250



miles from Harappa. It is spread over

An S-shaped Indus jar found at Bananwali

an area of about 400 by 400 meters

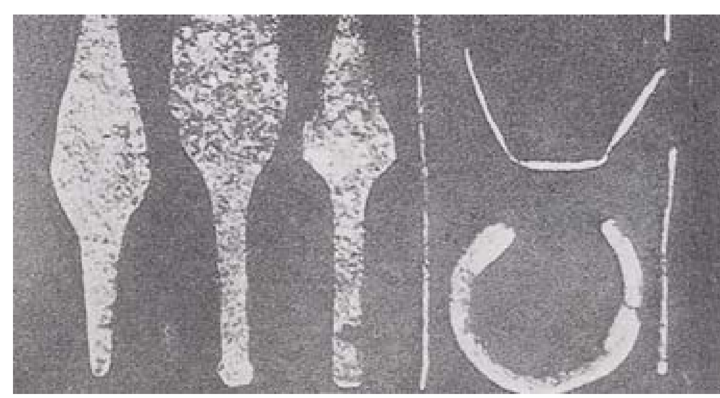
(after Bisht)

and rises to a height of 10 meters from along the base of the mound. There is no acropolis or citadel at Bananwali although a claim for the existence of a 'fortified acropolis' within the walled settlement has been made. A public drainage system is also conspicuously absent.



Bricks, both baked and sun-dried, were carefully molded into various sizes which, except the wedge-shaped examples, form two broad groups and always give the ratio of 1:2:4 as regards thickness, width and length. This ratio is different from

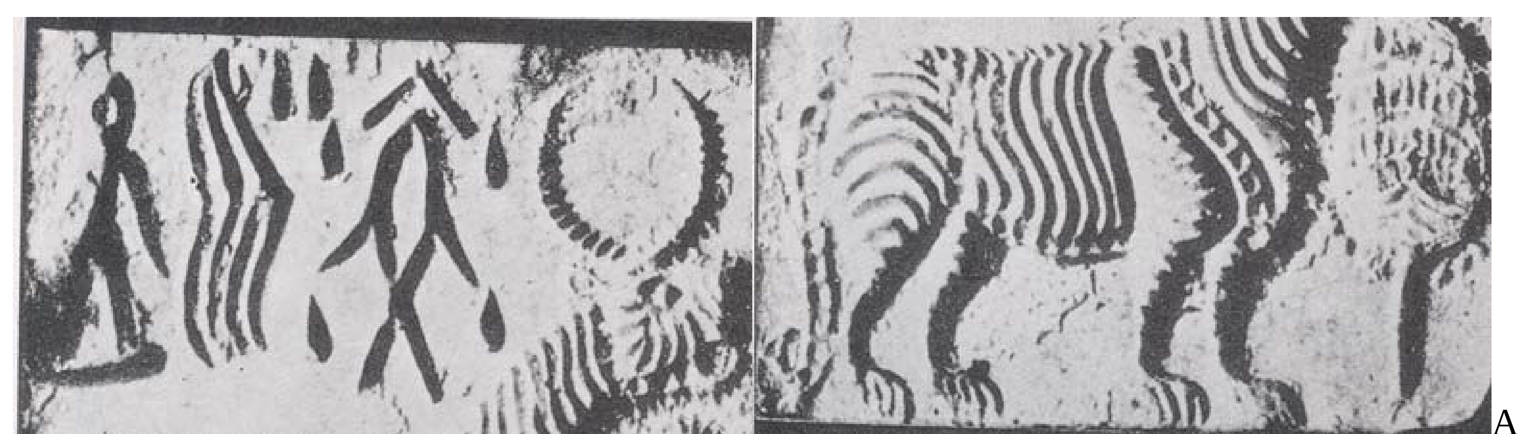
that found at the pre-Indus level. Smaller bricks were used in the construction of houses while the larger bricks were used in massive structures such



as town walls. This is in agreement of the practice at Harappa. Classical Indus ceramics

Copper impliments from Bananwali **Copper impliments from Bananwali (after Bisht)**

are present but it is not the dominant type.



A unicorn seal from Bananwali (after Bisht)

193 question mark. Here too, no archaeological details are available.

Notwithstanding the general similarities between the architecture and artifacts from Kalibangan, and those from the mainstream sites in the core area of the Indus Valley, some differences should be noted. Whereas the cities and towns in the core area were constructed largely of burnt brick, Kalibangan was mainly of mud brick construction. Some use of burnt brick there certainly was but the comparative rarity of it suggests the possibility that the means of producing large quantities of burnt brick did not match the knowledge of how to do so. In other words, it suggests a possible lack of sufficient number of brick-making artisans or abundant fuel. If we consider Kalibangan as a peripheral Indus town, these differences are not at all surprising.

Banawali: Banawali in Hissar District of Haryana in India is probably the easternmost settlement of the Harappans in the Indo-Gangetic divide. It is about 120 miles from Kalibangan and about 250 miles from Harappa. Banawali lies essentially in the Ghaggar valley. It is spread over an area of about 400

by 400 meters and rises to a height of 10 meters from the surrounding area. Suraj Bhan, an acclaimed archaeologist of India, reported twin mounds at Bananwali but they are not vouched for by the local folk. Neither does R.S.Bisht, the excavator of the site, vouches for twin mounds. In its present form, it is, therefore, a single-mound settlement, an unusual situation for a Harappan site.

Bisht excavated it for four seasons during 1974-77. Three occupations were revealed: PreIndus (not the Early Indus), Harappan, and postHarappan. There are no signs of developing any Indus traits before the appearance of the Mature Harappan features. Instead, it appears that the Harappan culture arrived here full-blown. This includes its town-planning and architecture, ceramics, seals, script, weights, clay figurines and miscellaneous tools. The older pre-Indus ceramic tradition continues throughout the Harappan period but in reduced frequency.

Excavations have indicated that the entire Harappan town at Bananwali was securely enclosed by massive walls, the eastern arm of which has already been determined for a length of nearly one hundred meters along the base of the mound. There is no acropolis or citadel at Bananwali although a claim for the existence of a ‘fortified acropolis’ within the walled settlement has been made. A public drainage system is also conspicuously absent. Bricks, both baked and sun-dried, were carefully molded into various sizes which, except the wedge-shaped examples, form two broad groups and always give the ratio of 1:2:4 as regards thickness, width and length. This ratio is different from that found at the pre-Indus level. Smaller bricks were used in the construction of houses while the larger bricks were used in massive structures such as town walls.

Classical Indus ceramics are present but it is not the dominant type. The Bara-type pottery, which constitutes a noteworthy feature of the Harappan sites in the upper Ghaggar-Sarasvati and Sutlej basins, is found intermixed with that of the Harappan. Usual beads of the Harappan type are in plenty, so are terracotta figurines. All this points to Bananwali as a bonafide Harappan settlement. Bisht makes an interesting observation that at Banawali the seals have only come from the Lower Town and not the Citadel. Banawali is rich in antiquities - seals, sealings, weights, beads, bangles, etc. This evidence, however, requires to be examined further. The site has also yielded, a large number of weights in small denominations. Two of these weigh around 0.216 g and 0.072 g. Amongst the terra cotta objects, a complete model of a plough is an important find. The presence of female figurines at Banawali, relates the site to Harappa and Mohenjodaro, whoere such figurines have also been reported. In this context, it needs to be stressed that at Kalibangan, no female figurines were found.

The next occupation (Period III) came up after a gap of some time. By now all that characterized the Mature Harappan had disappeared: there was no town-planning, no fortification, no seals, no weights and no use of script. The new settlement came up initially against the eastern wall of the Mature Harappan defenses, but later on it encroached to some extent on the eastern part of the mound itself. The houses in Period III were now made not of bricks but of mere rammed clay, though still oriented along the cardinal directions. This resurgence of some of the earlier features is also indicated by the pottery.

Rakhigarhi: Northeast from Kalibangan, we come to another important excavated site, Rakhigarhi. It is reported to be an exceptionally large site. Recent excavations here have uncovered a large number of terracotta figurines of animals. The unique plan of Rakhigarhi (also known as Rakhishahpur) is a huge mound in Hissar District of Haryana, associated with the right, or northern, bank of the Chautang River. Suraj Bhan discovered Rakhigarhi in 1964-68. He is also the excavator. There is both

a Sothi-Siswal and a Mature Harappan occupation at the site.

The site is about 17 meters in height. The southern face of the mounds is rather abrupt and steep. The northern side slopes down to the surrounding plain. The contours of the site have led the excavator to divide up the place into five mounds (RGR-l through RGR-5). RGR-6, a Sothi Siswal site was probably a separate settlement. Rakhigarhi is believed to be about 80 hectares in size, although an area as large as 250 hectares has also been claimed.

In size, dimensions, strategic location, and unique significance of the settlement, Rakhigarhi seems to be at par with Harappa, Ganweriwala, and Mohenjodaro but unless it is proven through large scale excavation, or through a careful and independent survey, no such parallelism can be drawn. Three layers of Pre-, Mature and Late phases of Indus Valley civilization have been reported at Rakhigarhi. What has so far been found uncannily indicates that Rakhigarhi settlement witnessed all the three phases and it is not yet known as to what proportion of the site was truly Harappan.

According to some piecemeal reports, occupation at Rakhigarhi begins during the Sothi-Siswal Phase, although thick deposits of the Hakra Wares are also claimed. The exposure of this period is still small, but it is 3 meters deep. Rectilinear houses, oriented to the cardinal directions, are said to be located. Baked brick was extensively used in this period, very unusual for the Pre-Harappan; however, the length, width, thickness ratio is 1:2:3, not the Indus 1:2:4. The bricks had graffiti marks on them, some signs of which are said to be ‘close to those in the Indus script’.

The Mature Harappan occupation presents a cemetery at Rakhigarhi with 11 skeletons with their heads in the north direction. Near the heads of these skeletons, utensils for everyday use are kept. The three female skeletons have shell bangles on their left wrists. Near one female skeleton, a gold armlet has been found. In addition semi precious stones have been found lying near the head, showing that they were part of a necklace. The new excavations uncovered eight interments. The grave pits were often brick-lined, with a single wooden coffin, as in Cemetery R-37 at Harappa.

A baked-brick street drain was found, to which a house drain was connected. Other households discharge into the street, still others into soak jars ‘pretty much along the pattern of Mohenjodaro’. The street drain is in the vicinity of a floor made of brickbats with four circular pits, perhaps dyeing vats. "Fire altars" with similarities to those reported from Kalibangan are also reported. The finds include standard Indus ceramics. Several "unicorn" seals have been found, along with a terracotta amulet with an elephant on the front. Of particular interest is a faience cylinder seal, with the long-snouted Indus crocodile, the *garial*, along with Indus script. Assorted objects of metal, including copper-bronze, gold, and silver have been recovered as well.

Digging so far reveals a ‘well planned city’ with a 1.92 m wide road. Pits surrounded by walls have been found, which are thought to be ‘sacrificial pits’, indicating that ‘fire was used extensively in their religious ceremonies’. There is, however, no corroborating evidence to that effect. Among other things that have been found are, terracotta statues, weights, bronze artifacts, combs, needles and terracotta seals. A bronze vessel has been found which is decorated with gold and silver. A gold foundry with about 3000 unpolished semi-precious stones, along with many polishing tools and stones were also recovered..

Notwithstanding its claimed size (80 to 250 hectares) and its importance as an Indus city rivaling Harappa and Mohenjo-daro, nothing much has been published yet. Whatever one reads in popular

literature or on the internet and various Hindutva literature, is unscientific reporting. Suraj Bhan himself is not that much reliable archaeologist. Thus, the significance of this discovery cannot be ascertained as yet. On the surface of it, Rakhighari could be an important find and it could teach us a lot about the eastward expansion of the Harappan Civilization if the records of excavation could be made available to the archaeological community.

Access to Raw Materials: Harappa, Kalibangan, and Ganweriwala had distinctly different access to stone, mineral and exotic resources. It has been hypothesized that this region obtained these raw materials from Mohenjodaro. In more recent times, the resource rich areas in the East, namely Rajasthan, Karantaka or even Gujarat, have been offered as the source of the needed material for these northern region of the Harappan Civilizations. Both of these hypotheses seem to be rather far-fetched. First of all, the East was populated by hunter-gatherers who could, by the very nature of their subsistence, not involve themselves in any trade activityes which required any degree of organization for extracting, gathering, and transporting raw materials. There is also no sign of any Harappan outposts in this area on the pattern of Shortugai in northern Afghanistan. Secondly, Harappa's natural hinterland, comprising the outer Himalayas, the Salt Range, and the Sulaiman Mountains, was a much richer and more diverse area than the hinterland in the East. This hypothesis has been conclusively proved by the extensive and systematic research by Randall Law (10,11,12), discussed in some details elsewhere in this book.

Mohenjodaro could take advantage of three major trade routes to the west: the Arabian Sea, southern Baluchistan, and the Bolan Pass and it could theoretically provide the needed raw material to Ganweriwala and Kalibangan but it assumes an intense internal trade within the Harappan region for which there is no archaeological evidence. In the absence of any better guess, one could only assume that Ganweriwala and Kalibangan depended on Harappa, which had access to diverse and rich resources almost within its own geographical region. Harappa thus served Ganweriwala and its surroundings as well as Kalibangan as a 'gateway' to the mineral wealth of the West. Ratnagar (9) and Fenstress (5) go a step farther: they tend to imply that the very existence of Harappa depended on its function as a 'gateway' city. Possehl, on the other hand, counts the existence of Harappa on the same factors which were important for the existence of Mohenjo-daro, and other Indus cities.

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Chapter 9

Harappan Sites in Kutch and Saurashtra



Kutch and Saurashtra in Gujarat (India) are important in context with the Harappan Civilization for two reasons. First, this is the area for which we have clear evidence of the Indus colonization from the Early Harappan days as well as the establishment of possible trade outposts in the fashion of Shortugai in the west. This process of cultural expansion is vital to the understanding of the Harappan culture and economy in an area that is ecologically different from its core area of Sindh and Punjab. Second, the Harappan settlements in Kutch and Saurashtra provide us with a large window through which we can look at the Harappan culture in its old age. Such a view is rather limited in the core areas of the Indus Civilization. The study of the Harappan Civilization in this peripheral but important area is also instructive in another context: it is a classic example of using archaeology in the service of political and religious agenda of the state and the society at large.

Although these sites are routinely included in the core area of the Mature Harappan culture, the fact remains that most of these sites are of later origins, namely belonging to the Late Harappan time when the Harappan Civilization in the core area had already started to wither away and heading to its end. This is why, the cultural traits of these sites, although sharing much in common with Mohenjo-daro and Harappa, were different, to the extent that Possehl had to call this area the sphere of the “Sorath Harppans”.

So far more than 60 “Indus” settlements have been found in Kutch. Out of them about 40 belong to the 'Early' phase and most of the remaining represent the Late phase of the Mature Harappan culture. Only five settlements of the 'Early phase' continue into the 'Late’ (the urban and posturban) phase and the remaining are new settlements of the Late Harappans. On the basis of general evidence coming up from Kutch and Saurashtra, it appears that the Harapans brought here their full blown culture and lived almost a full life before their culture declined and fragmented, causing large scale migration from Kutch to the hinterland of Gujarat. The sites Dholavira, Lothal, Surkatoda, and Gola Dhoro are noteworthy for their urban character. All of them, with the exception of Dholavira, are rather small and all of them represent the Harappan urbanism in its old age. We shall review them in the followings but before we begin, a cautionary note must be struck.

Almost all of the archaeological surveys and excavations in Kutch and Saurastra have been done after the Partition of British India into modernday India and Pakistan, and all of these efforts, barring the excavation at Rodji, have been lead by Indian archaeologists.There has been little international collaboration and there has been practically no peer reviews of the published reports. As a result of these purely indigenous efforts without any checks and balances, a large amount of pseudoarchaeological literature has sprung up and these popular writings form the basis of our information. Most of these writings are hyperbolic in nature and largely devoid of scholarly analysis. To make matters worse, the celebrated Indian excavators who worked in this region are known

Hindutva ideologues and in view of their missionary zeal their analysis is heavily tainted with certain political and religious agenda. Even the veracity of their data could be put in question. Nevertheless, until some authentic information becomes available, we have no choice but to use the data that is indeed available, suspect or not.

For the purpose of this chapter, neighboring Kutch is more important to us than Saurashtra or Gujarat at large. The settlements in Saurashtra are of interest to us and they will also come under discussion. Our approach will be to consider the neighboring Kutch as a part of the core area but look at Saurashtra and the rest of Gujarat in terms of peripheral areas. The archaeological evidence will show the validity of this approach although it is in variance with the traditional approach.

Kutch forms an intermediate area between Sindh and Saurashtra. The Ranns, the great expanses of salt and sand plains, separate Kutch from Sindh in the north and from Saurashtra in the south. The sea on all sides, except in the east, turns Kutch into a kind of closed system. The Ranns are not deserts in the sense the Thar or the Sahara are. They are vast plain-like stretches of sand leveled to an asphalt-like consistency by salty efflorescence and brine. During the monsoons and until the onset of winter, they remain waterlogged and difficult to cross. While Kutch and Saurashtra are ecologically speaking a contiguous unit, geomorphologically and environmentally they stand apart. Both of these areas are different from Sindh and Punjab, the traditional homeland of the Harappans.

Within the great depression of the Rann of Kutch, water stands for about four months during the monsoon season. In the dry months the Rann is a vast, empty and incredibly silent stretch of mud. In the third millennium, probably because the discharge of the Luni river was greater then than today and because the Eastern Nara was a large stream, the mud flats of the Rann probably stood under water all the year round, and the water was probably sweeter. That is to say, in ancient times the water was of fluvial (river) as well as marine (sea) origin. So also, the underground aquifer in this arid zone (rainfall is less than forty centimeters) at that time must have held sweet water. Note that Kutch has no perennial river, and today its subsoil water is brackish.

There is compelling evidence for the Ranns being an area that was under a permanent sheet of water during the time of the Harappans. Only as late as 14th century it is referred to as being a marshy howling desert. Ecological evidence suggests that during the Harappan period a great part of Gujrat enjoyed a wetter climate. Riverine stream flow into the Ranns was thus greater than it is today. Subsequently, with the onset of a dry phase and with the regression of the sea level, the Ranns came into existence and those Harappan settlements which had originally been on the coast found themselves some distance inland. This may be one of the reasons why their economy declined.

Settlement Pattern and Site Distribution: The available archaeological literature is very ambiguous about the settlement pattern of Kutch and Saurastra, and some of this ambiguity could be deliberate. The archaeologists and their enthusiastic adherents talk about “Indus” or “Harappan” sites in Kutch and Saurashtra as though these were from the Mature Harappan period when in fact most of them belong to post-Harappan period, not deserving the appellation of Harappan or even Indus. Similarly, all the pre-Harappan settlements of the 4th millennium BC are also lumped together with the “Harappan” settlements. To make matters worse, some western archaeologists, notably Possehl, would talk about ‘Saurath Harappans” of sites when the archaeological evidence points to only a peripheral affinity with the Harappan Civilization. It is therefore difficult to assess the extent and process of the overflow or the expansion of the Indus Civilization into these borderline areas. Such an

ambiguity certainly suites the ‘patriotic’ Indian archaeologists, who have worked in this area.

According to the available literature, so far in excess of 60 “Indus” or “Harappan” settlements have been found in Kutch. It appears that out of them about 40 belong to the 'early' phase and the remaining represent the ‘late’ phase of the Harappan culture. Only five settlements of the 'early phase' continue into the 'late phase' and the remaining are new settlements of the late Harappans. Dholavira, Lothal, Gola Dhora, and Surkotada are the most prominent.

The distribution of Harappan settlements in Kutch and Saurashtra seems to differ markedly from each other and from that of the neighboring Sindh. Considering that Saurashtra is only slightly larger than Kutch, the Indus settlements are few and far between in Saurashtra: most of them are concentrated in Kutch. Dholavira and Surkotada appear to be the largest Indus sites in Kutch and both of these sites have evidence for Mature Indus Phase. There are a few divergences from Harappan norms but these are largely due to a change of environment and ecology. Thus, if we concentrate on Mature Harappan settlements, Kutch stands out in comparison with Saurastra and it is here that most of the Mature Harappan finds have been made: out of 20 Mature Indus settlements located in Gujarat, 14 are situated in Kutch.

The differences between the settlement of Gujarat and Sind are most manifest in their subsistence economy. Subsistence crops in Kutch and Saurashtra are dominated by millets and sorgam (*Bajra jawa*r, and *china*, for example). All of them are *kharif* crops as opposed to wheat and barley which are *rabi* crops in Sind. Animal husbandry has been known here from fifth millennium BC, most likely through the intrusion of Baluch and Sindhi pastoralists from the west. However, instead of goats and sheep in Baluchistan and Sind, the ‘colonists’ in Kutch and Saurashtra generally favored cattle.

Most of the Mature Harappan settlements in Kutch and Saurastra have been portrayed as a part of an extensive trading network and that the Harappan settlements in Kutch, like Dholavira and Surkotada, were more dependent on trade and industry than on a purely food-producing economy. The communication with the center is said to have been sea-borne but overland transportation during favorable months of the year cannot be ruled out. There is some evidence for some regional trade and there might be some international trade between Lothal and the Persian Gulf but this trade has been hyped beyond any reasonable and plausible level by some Indian archaeologists and writers of popular history. A small number of minor settlements cannot support this kind of fantastic trade relationship with distant regions, as S.R.Rao and others want us to believe.

Mature Harappan Settlement: Recent advances have drastically changed the earlier interpretations about the existence of sites in Gujarat during the Mature/Urban Harappan phase. Possehl and Raval (10) claim regionality of the Harappan culture after a systematic analysis of the excavated material from Rojdi. Although some of the classical Harappan traits are found at Rojdi, the ceramic assemblage has nothing in common with classical Harappan pottery as represented in Kutch and Sindh in Mature/Urban Harappan phase, although the new radiocarbon determinations indicate that the early phase levels at Rojdi were contemporaneous with the Mature/Urban phase of the Harappan culture. As a result two distinct categories of settlements are identified in Gujarat i.e., 1) site representing classical Harappan traits and 2) sites showing regional manifestation of the Harappan culture, proposed by Possehl as Sindhi and Sorath Harappan, respectively (11).

In this context it is imperative to note that in more than five hundred sites associated with different levels of Harappan and non-Harappan affiliations the settlements representing Mature/Urban phase

(Sindhi Harappan) are few and far between. As stated earlier, out of 25 settlements of this first category, 15 are situated in Kutch while rest are sparsely distributed in other parts of the region. Location-wise these sites can be broadly categorized as coastal settlements, situated either on the sea coast or on the margins of the Ranns, which are hypothesized as being originally forming an arm of the Arabian Sea. From the site distribution pattern, it appears that these sites are more frequent in the eastern parts of Kutch than the coastal area of Saurashtra including the eastern margins of the of Rann of Kutch. The discovery of Lothal, Nageswar, Padri, Kuntasi and Bagasra in Saurashtra, Nagwada and Zekhada in north Gujarat and Dholavira, Shikarpur, Surkotada and Pabumath in Kutch, located on the coast or along the margins of the geomorphological features like the Ranns has amply demonstrated that these settlements were engaged in specialized craft production as industrial/ manufacturing centers or served as trading cum administrative centers or both. Their locational setup clearly demonstrates that these were developed mainly for trade and access to raw materials of specific commodities and to facilitate their flow towards the area of demand specially the nucleus Harappan Urban centers. Almost all these sites are associated with the manufacture of specialized items of semi-precious stones, steatite, faience, chank shell, ivory, copper, etc. for the purpose of trade. Of these, regional centers like Lothal and Dholavira definitely acted as trading and administrative stations, demonstrating the dependence of the central Indus Urban centers on outlying resource areas of Gujarat. Some of the settlements in Kutch like Surkotada and Pabumath acted as garrison defense outposts in order to control the resource areas of further south and east. It is worth noting that quite a few of these are strongly fortified. Besides, most of these coastal sites have more relevant connotations so far as overseas trade relationships with settlements of western world specially the Middle East are concerned.

On the other hand, sites representing regional manifestation of the Harappa culture (Sorath Harappan) are more frequent in central Saurashtra. Although their precise number is not known they certainly outnumber the sites of first category (Sindhi Harappan). Most of the sites of this category, because of their location, are regarded as territorial settlements, confined to the hinterland region surrounded by considerable landmass. It has been noticed that these territorial sites are never as large and economically as developed as the coastal ones except Rojdi. The striking feature of these settlements is that the inhabitants were farmers and herders and there is very little evidence for craft activities or 'Industrial' production of metals, beads, bangles or similar items.

Prior to the arrival of the Harappans in Gujarat, as discussed earlier, this land was already inhabited by the local/indigenous regional Chalcolithic communities, with whom the immigrant Harappans interacted for effective exploitation of the local resources in order to sustain their specific needs. This has resulted into the amalgamation of more than one cultural trait in the material inventory at most of the Harappan settlements during its Mature/ Urban phase. Such a co-existence suggests symbiotic relationships between two or more divergent cultural communities. Many a times, non-Harappan elements are found predominant than the Harappan at most of the sites. Ceramic assemblage recovered from the earliest levels at Lothal would corroborate this assumption (4).

Unlike the fertile tracts of the Indus Valley in Sindh, none of the rivers in Gujarat, particularly of Harappan eco-zones, lend themselves for irrigational use with ancient technology. Agriculture here is entirely dependent on dry farming techniques. Therefore, alternative subsistence strategies were adopted by the Harappan and all Chalcolithic communities to suit the environmental setting. As a result, most of these sites account for a complex system of occupational diversity. What emerges is a complicated picture of the varying interrelated aspects of sedentism, pastoralism, hunting and many

other diversified resource exploitation strategies. In order to compensate for dry scarcity and to minimize the risks of periodic rainfall fluctuations, we can hypothesize an extensive land use pattern which took advantage of the region's total available subsistence potentiality. Wide range of site locations, thus, not only highlights the adaptive skills of the enterprising Harappans but also throws light on how it gave rise to the regional phenomena called by Possehl the "Sorath Harappan" (12).

It is generally believed that the Mature Harappan settlements in Kutch and Saurastra were a part of an extensive trading network and that they were more dependent on trade and industry than on a purely food-producing economy. There is strong evidence for such a trade at Lothal but it has been hyped beyond any reasonable and plausible level by some Indian archaeologists for which there is in fact no logical or archaeological basis. A small number of minor settlements cannot support this kind of fantastic trade relationship with some distant regions.

Post-Urban Phase: In the absence of an abrupt end of the Mature/Urban phase, a continuity has been seen in the form of degenerated phase at most of the Harappan settlements in Gujarat. Therefore, keeping in view the radiocarbon determinations from different known sites and reanalysis of the excavated data it has been felt that the occupations during Lothal B, Rangpur IIC and III, Kuntasi II, Padri IIIB, Prabhas Patan II and III, and Dholavira stages VI and VII marked the onset of PostUrban Harappan phase in Gujarat. Apart from these above cited excavated sites, where habitational strata have shown continuity in Harappan occupation from Urban to Post-Urban phases, the excavations at Kanewal, Nesadi, Ratanpura and Oriyo Timbo demonstrate an independent existence of this Post-Urban Harappan phase. Among the distinctive features of the these post-Urban Harappan settlements in Gujarat, the first and foremost is the general economic decline in material culture which causes a gradual process of de-urbanization. Some of the Mature/Urban sites do not survive during the post-Urban phase. Nageswar, Nagwada, Surkotada, etc. – to name a few – are good examples to explain such adverse effects. Shift in climatic conditions causing increased aridity is regarded as one of the responsible factors for this change.

It is clear that though certain forms like 'Indus goblets', beakers and 'S' shaped jars almost disappear, other characteristic ceramics, including perforated jar, continue with slight changes in shape and decoration; however, the fabric became coarser and in painted designs linear patterns became common in contrast to the diagnostic Mature Harappan naturalistic decorations. The convex-sided bowls developed a blunt or even sharp carination at the shoulder. The stud of the handled bowl which became longer at Rangpur did not undergo any change at Rojdi, where long and short handles occur at all the levels. The stem part of the dish-on-stand became squat while the projected dish acquired a beaded rim. Lustrous Red ware, characterized by high polished red slip became the prominent ceramic type. The white painted Black and Red ware also became more conspicuous by its presence. Graffiti on pottery, some of which resemble the signs of the Harappan script, however, remained, reminding us of the continuity of the earlier tradition, though in a reduced frequency. Although classical reserved Slip ware totally disappeared, its crude variant as an imitation was found lingering at a few sites. This transformation is not reflected in ceramics alone. Among other artifacts, long chert blades, a material that had been imported from the Sukar Rohri hills of Sindh, Pakistan, was no longer available because of the steep fall in trade and were substituted for by smaller blades of locally available chert and chalcedony. Perhaps for the same reason, the cubical chert/agate weights, so diagnostic of the Urban phase are no longer found and replaced by truncated spherical weights of sandstone and similar material. Though terracotta beads become common, simple varieties of semi-precious stone beads and shell objects did continue to some extent because of the local availability of

the required raw material. The absence of steatite micro and disc beads, inspite of local availability of raw material in certain parts of the region, again reflects on the restricted movement of the people. In addition, there are stray occurrences of terracotta triangular cakes and sporadic finds of stamped seals with only inscriptions, devoid of the usual animal or other figure depictions. The overall decline in the material culture of this phase is also reflected on the use of metal objects.

The deterioration in settlement pattern is also very explicit as compared to that in the earlier phase. The acropolis, warehouse and “dockyard” at Lothal were abandoned. Even the house floors were now made of brickbats collected from earlier constructions. At Dholavira, during phases VI and VII, the one-time city shrank into small settlement confined to the Citadel and southern margin of the Middle Town where they delimited it by raising a wall of an entirely different workmanship. Ordinary type of circular residential structures without use of bricks again suggest the adverse economic conditions of the people. The archaeological data recovered from these sites witness clear signs of shrinkage in the size of settlements during this cultural phase.

The cultural variables seen in subsistence and settlement patterns show a lack of standardization and homogeneity in its material culture during this post-Urban Harappan phase. The small sizes of settlements with non-descriptive architectural pattern, reduced number of items of material culture and thin habitational deposits corroborate this assumption. Although, there was certainly a decline in the material prosperity, a basic continuity of the Harappan tradition was still observed in the form of some lingering features of the Harappan culture transforming the urban way of life into a rural one. As a result, the social fabric of the post-Urban cultures became weak and economic conditions were geared more to meet the subsistence requirements than to gain any surplus. Because of week political power, it witnessed a process of decentralization and localization, giving rise to regional cultural expressions like Lustrous Red ware and Prabhas ware.

Dholavira: Dholavira, locally known as Kotada, in the Khadir island of Kutch, is remarkable for its area and archaeological deposit. Among the excavated sites of Kutch, Dholavira is perhaps the largest with an extent of 60 hectares (but not all of it inhabited at any one time). It measures about 600 m. on the north-south axis and 775 m. on the eastwest. Dholavira is situated in the Great Rann of Kutch. Before Partition, this area was culturally and linguistically closer to Sindh than it was to Saurastra and northern Gujarat. Dholavira is a relatively recent discovery. It became famous for yielding an inscription of ten large-sized signs of the Harappan script: indeed the oldest sign-board of the world. A variety of funerary structures is yet another feature of exceeding importance throwing new light on the

Dholavira (Gujarati: !"#$%&'$) is an archaeological sitein Khadirbet in Bhachau Taluka of Kachchh districtKalibangan, Rupar, Dholavira, and Lothal.of Gujarat state in western India, which has taken its name from a modern village 1 km south of it. The site of Dholavira, locally known as *Kotada timba* contains ruins of an ancient Harappan city. It is one of the largest and most prominent archaeological sites in India belonging to the Indus Valley Civilization. It is Ancient Pakistan - An Archaeological History island in the Kutch Desert Wildlife Sanctuary in Great Rann of Kutch. The site is

Contents

surrounded by water in the monsoon season.[1] The site was occupied from c.2650 BCE, declining slowly

socio-religious beliefs of the Hardpans at a time occupation, or stages, at the site. The first two fall after about 2100 BCE. It was briefly abandoned and reoccupied until c.1450 BCE.
when their urban civilization was taking a downward within the Early Harappan-Mature Harappan Transi
trend.The site was discovered in 1967-8 by J. P. Joshi and is the fifth largest Harappan site in the Indian, and V are Mature Harappan, and1 Chronology of Dholavira tion. Stages III, IV
subcontinent, and has been under excavation almost continuously since 1990 by the Archaeological Survey Being one of the five largest Harappan cities the final two stages are Late- or post-Harappan.
2 Excavations
in the Indus realm, Dholavira has yielded many of India. Eight large urban centers have been discovered: Harappa, Mohenjo Daro, Ganeriwala, Rakhigarhi,

Kalibangan, Rupar, Dholavira, and Lothal. The radiocarbon method does not seem to work well at Dholavira, so the chronology for the site is an estimate put together using a comparative method.

Stage I was founded on virgin soil. These pioneers knew the arts of copper working, bead
3 Architecture and material culture
firsts in respect of the Harappan Civilization. Four
3.1 Reservoirs
teen field seasons of excavation through an enor
mous deposit caused by the successive settlements **Contents**
3.2 Other structures and objects
at the site for over 1500 years during the 3rd mil
4 Language and Script

lennium and unto the middle of the 2nd millennium 1 Chronology of Dholavira
BC have revealed seven significant cultural stages 4.1 Sign board2 Excavations Ancient Pakistan - An Archaeological Historymaking, and masonry and were careful planners of documenting the rise and fall of the Indus Civiliza3 Architecture and material culture their architecture. The settlement of Stage I wasof 60 hectares (but not all of it inhabited at any one decline.

5 How to reach Dholavira
3.1 Reservoirs
time). It measures about 600 m. on the north-south axis
tion in the peripheries of the core area. The city is 3.2 Other structures and objects
and 775 m. on the east-west. Dholavira is situated in scape consisted of a bipartite 'citadel', a 'middle town' and a 'lower town', two 'stadia', an 'annexe', a series of
located in the vicinity of the Citadel and was sur
6 References remarkable for its exquisite planning, monumentalthe Great Rann of Kutch. Before Partition, this area was rounded by a very substantial fortification, as thick
structures,
7 External links
aesthetic water architecture, amazing4.1 Sign boardculturally and linguistically closer to Sindh than it was toas 11 meters at its base. The houses were built of harvesting system and a variety in funerary archi
Saurastra and northern Gujarat. Dholavira is a relatively
ning on all four sides. Interestingly, inside the city, too,
molded mud bricks, with the Indus proportion of recent discovery. It became famous for yielding an inthere was an intricate system of fortifications. The city

tecture. It also enjoys the unique distinction of yield
6 References
scription of ten large-sized signs of the Harappan script: 1:2:4. The ceramics are a mix, but there are paral was, perhaps,
configured like a large parallelogram ing an inscription made up of ten large-sized signs
indeed the oldest sign-board of the world. A variety of
boldly outlined by massive walls with their longer axis
lels to Amri, Nausharo, and Kot Diji during the Early of the Indus script.

Chronology of Dholavira

funerary structures is yet another feature of exceeding being from the east to west. On the bases of their rela
importance throwing new light on the socio-religious Harappan-Mature Harappan Transition. This early
Chronology of Dholavira beliefs of the Hardpans at a time when their urban civili
zation was taking a downward trend.
three principal divisions are designated tentatively as
settlement is oriented in the
direc
R.S. Bisht, the director of the Dholavira excavations, has defined following seven stages of occupation, at Bisht (1,2,3), the director of
the site
[3]. **Chronology of Dholovira** **Chronology of Dholovira** R.S. Bisht, the director of the Dholavira excavations, has defined following seven stages of occupation, attions, but the layout of the the site[3]:

Stages Stage I
Stage II Stage III Stage IV Stage V

Stage VI
Dates

Stages Dates
Stage I 2650-2550 BCE Early Harappan - Mature Harappan Transition A Stage II

2650-2550 BCE Early Harappan - Mature Harappan Transition A
2550-2500 BCE Early Harappan - Mature Harappan Transition B
2550-2500 BCE Early Harappan - Mature Harappan Transition B
Stage IV
2500-2200 BCE Mature Harappan A Stage V

2200-2000 BCE Mature Harappan B 2000-1900 BCE Mature Harappan C 2200-2000 BCE Mature Harappan B1900-1850 BCE Period of desertion

Stage VI 1850-1750 BCE Posturban Harappan A
2000-1900 BCE Mature Harappan C 1750-1650 BCE Period of desertion
1900-1850 BCE Period of desertion Stage VII 1650-1450 BCE Posturban Harappan B

1850-1750 BCE Posturban Harappan A Being one of the five largest Harappan cities in the Indus realm, Dholavira has yielded many firsts in
1750-1650 BCE Period of desertion Civilization. Fourteen field seasons of excavation through an enormous deposit fined

seven periods of occupation, or walls is very different from

stages, at the site. The first two fall
that of other Indus settleHarappan-Mature Harappan Transition. Stages III, IV, m e n t s ,
e s p e c i a l l y
and V are Mature Harappan, and Mohenjo-daro.the final two stages are Late- or post-Harappan.
The
radiocarbon
Stage II sees the widenmethod does not seem to work well
ing and strengthening ofat Dholavira, so the chronology for the
the site is an estimate put together
fortification wall and
the
using a comparative method.
enlargement theStage I was founded on virginof
settlement withsoil. These pioneers knew the arts of copper working,
and masonry and

construcbead making, were

tion to the north. The early
careful
fortification wall was foundplanners of their architecture. The to
settlement of Stage I was located in beplastered on boththe vicinity of the Citadel and was
sides, and parts of it weresubstantial fortification, as thick as 11 meters at
covered with a veneer of

Stage VII 1650-1450 BCE Posturban Harappan B caused by the successive settlements at the site for its base. The houses were built of molded mud bricks, with the Indus proportion of 1:2:4. The ceramics are a

stone. At this time the in
mix, but there are parallels to Amri, Nausharo, and Kot

Diji during the Early Harappan-Mature Harappan Transiover 1500 years during the 3rd millennium and unto the middle of the 2nd

millennium BC have revealed sevenDholavira has been excavated by the Arsignificant cultural stages documenting
chaeological Survey of India since 1989. According
the rise and fall of the Indus Civilization in the peripheries of the core area. The
to the archaeological reports, habitation at the sitecity is remarkable for its exquisite planbegan well before
3000 B.C. and continued for
ning, monumental structures, aesthetic
architecture, amazing water harvesting
more than a millennium. This long history provides system and a variety in funerary archiimportant
information about the formative stage of

tecture. It also enjoys the unique distinction of yielding an inscription made the Indus Civilization and its subsequent
decline.up of ten large-sized signs of the Indus

The salient components of the full-grown cityscape consisted of a bipartite 'citadel', a 'middle
Dholavira has been excavated by the Archaeological Survey of India
town' and a 'lower town', two 'stadia', an 'annexe', asince 1989. According to the archaeoseries of reservoirs all

set within an enormous forti
logical reports, habitation at the site began well before 3000 B.C. and con
fication running on all four sides. Interestingly, intinued for more than a millennium. This side the city, too, there was an intricate system of
long history provides important information about the formative stage of the

fortifications. The city was, perhaps, configured like Indus Civilization and its subsequent a large parallelogram boldly outlined by massive walls with their longer axis being from the east to west. On the bases of their relative location, planning, defenses and architecture, the three principal divisions are designated tentatively as 'citadel', 'middle town', and 'lower town'.

Bisht (1,2,3), the director of the Dholavira excavations, has defined seven periods of



Dholavira Citadel: South-east corner

hibited an affinity for bright plasters, white and reddish pink, that is still preserved in the fortification wall of Stage II. The use of this bright plaster continues through Stage III, then it is discontinued. The material culture of Stages I and II is similar, but there is an increase in the number of antiquities that were recovered in excavation. A boat-shaped crucible indicates metalworking at the site.

During Stage III, Dholavira grew from a small settlement to a large town or city with two sets of fortifications, separate districts, and a water storage system of significant scale. Painted Indus black-onred ware pottery and small finds, including square



Dholavira: A corridor inside citadel

Indus stamp seals, allow us t o d a t e t h i s stage to the early Mature Harappan. Some of the s t a m p s e a l s from Stage III at Dholavira do not bear Indus

writing, but animal designs are present. They could represent the early conventions of Indus seal making when no script was used. It is possible that the early artisans who came to this area did not know the art of writing, the scribers came later.

Stage III also saw the clearing, leveling, and paving of an old Stage II residential area. This created an expanse of open ground that Bisht believes was a ceremonial ground. To the north, a large residential area called the Middle Town was laid out, secured by the second fortification wall. This latter facility was provided with gates, bastions, and drains. The Middle Town was divided into residential areas, with streets and lanes laid out in a grid pattern. These rectilinear houses are within the Mature Harappan mold and are equipped with sumps and jars in the streets, apparently for sanitary purposes. There are no street drains here or in the Lower Town, and no evidence of bathing facilities was found; these characteristics are somewhat different from Mohenjo-daro and probably represent an elementary level of Mature Indus culture. The absence of bathing facilities in homes and the drains in street may also indicate the scarcity of water. Kutch is virtually a desert, and there is no large river like the Indus nearby, so the available water was from both rain and runoff which had to be collected and stored for providing the functional



Dholavira: A finely crafted pillar base

minimum tants created sixteen more reservoirs varying size during Stage III. Some of these took advantage of the slope of the ground within the large settlement, a drop of 13 m from northeast to northwest. Recent work has revealed that the collected rain water mostly emptied two large reservoirs, one to the east of the Castle and one to its

Dholavira: A water harvesting conduit

south. The eastern res
Dholavira: A water harvest
for yielding a spectacularly large inscription
ervoir
has
thirty-one
ing conduit
made up of 10 unusually big Harappan letters
which were surely inlaid on a wooden board
steps from top to bot
since decayed but fairly determinable for its
size and shape which matched well with the
tom and is a marvel of technology and effort. We
ing thereby that it was originally sported on
know that this reservoir was 24 meters wide and
so as to be visible from afar for its white bril
varied between 7.5 and 5 meters in depth. The res
Of special note should also be the pil
ervoir to the south of the Castle has an exposed
rior of the chambers of both east and west



length of 95 meters and a width of approximately 10 Remains of houses at Dholavira downtown. Note the use of stone instead of bricks. **The remains of two round huts at Dholavira** of chambers for giving support to the respec
meters. The depth varies from about 2 to 4 meters. storage system of significant scale. Painted Indus black-on-red ware pottery and small Reservoirs are cut through stones vertically. They 197 finds, including square Indus stamp seals, allow us to date this stage to the early Mature
Harappan. Some of the stamp seals from Stage III at Dholavira do not bear Indus
are about 7 meters deep and 79 meters long. Res
writing, but animal designs are present. They could represent the early conventions of Indus seal making when no script was used. It is possible that the early artisans who
ervoirs skirted the city while citadel and bath are
came to this area did not know the art of writing, the scribers came later. Stage III also saw the clearing , leveling, and paving of an old
centrally located on raised ground. A large well with
Stage II residential area. This created an expanse of open ground that Bisht believes was a ceremonial
a stone-cut trough to connect the drain meant for
ground.
To the north, a large residential area called the
conducting water to a storage tank also found.
Middle Town was laid out, secured by the second fortification wall. This latter facility was provided
Bathing tank had steps descending inwards.
with gates, bastions, and drains. The Middle Town was divided into residential areas, with streets and
Toward the end of Stage III Dholavira seems
lanes laid out in a grid pattern. These rectilinear houses are within the Mature Harappan mold and
to have been struck by an earthquake of major

are equipped with sumps and jars in the streets, apparently for sanitary purposes. There are no street drains here or in the Lower Town, and

no

magnitude. This is documented by slip faults in sec
evidence of bathing facilities was found; these characteristics are somewhat different from
tions and the displacement of architectural features.
Mohenjodaro and probably represent an elementary level of Mature Indus culture. The absence of

This led to repairs within Stage III that are very large in scale. Parts of the citadel and the residen
tial areas were cleared of houses. Other residential
areas were extended, especially to the east, neces
sitating the extension of the city wall. Monumental
gateways were built on the citadel, and the settle
ment reached its largest, best-organized, perfected
point.

Significantly, during the first three stages, i.e., I, II and III, the inhabitants exhibited an abiding 202

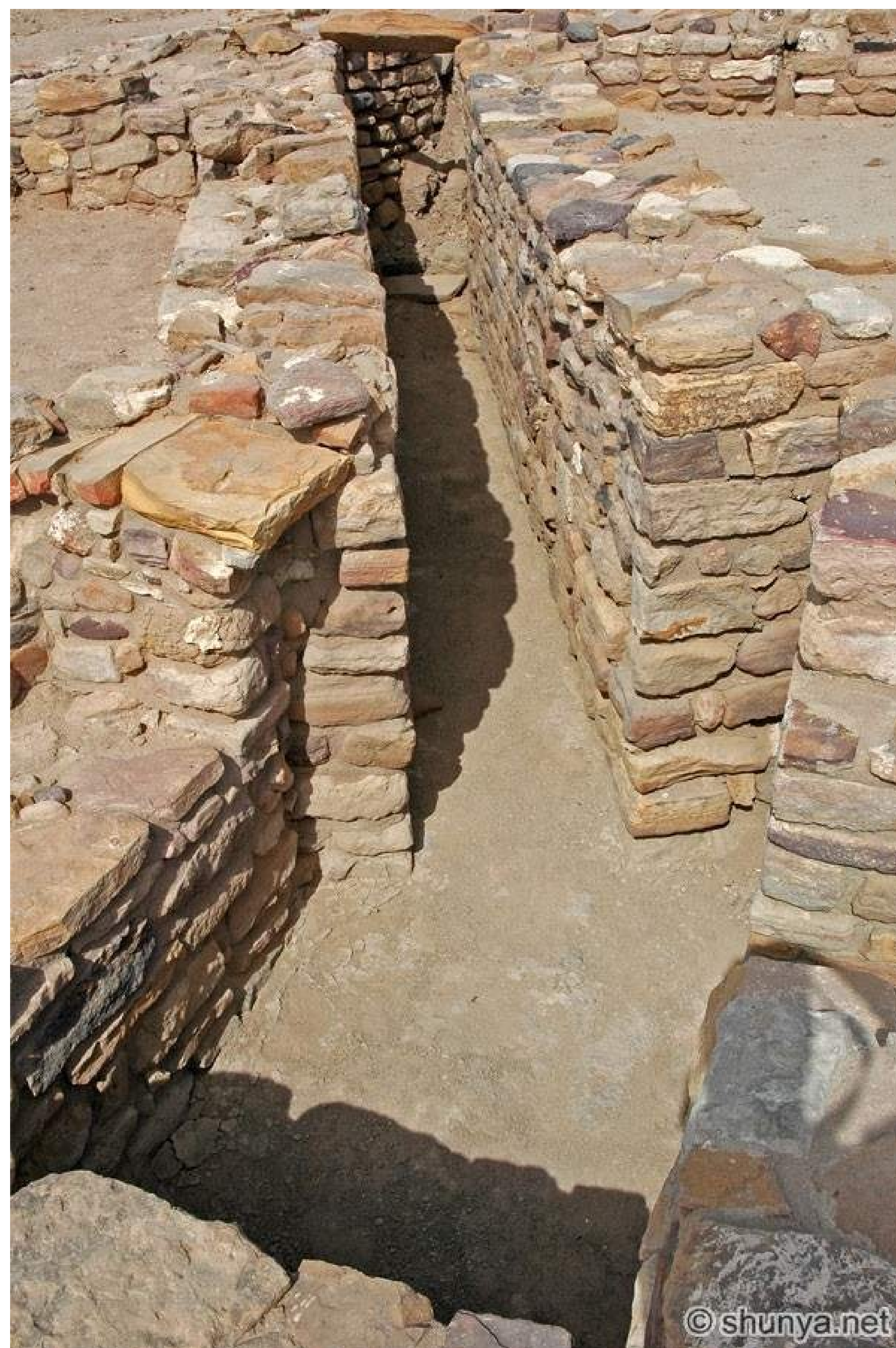
In Phase III, the inhabitants of Dholavira in
vested substantially in the provision of water. As
one part of the water-harvesting system, a platform,
the so-called "castle", was built with a network of
connected drains and catchment surfaces. These
collected rainwater and moved it into two intercon
nected chambers of stone. One part of this system
is a remarkable water cascade, quite carefully fash ioned of cut stone. The seasonal stream that runs to

The north gate was the most elaborate and the most elegant and imposing on a vantage location comthe north and south of the site was dammed at sevmanding over sprawling cityscape and enchanting land

eral places. These
scape. It had two large and elevated chambers flanking
bunds
allowed the inhabitants of an L-shaped staircase ascending from the inner end. Its
Dholavira to direct and conserve runoff from thelofty front terrace, 6m high and 12m deep, was coninterior of Kadir Island.

nected to an equally broad pathway with a slope towards the east where it terminated separately onto a stadium-like space. The north gate is also remarkable

Theinhabiof Dholavira or of



tive roofs as well. Each wall had a central pillar and a pilaster at either end, mow represented by their lower members as those were composite ones. These members were skillfully sculpted and smoothened out of bright yellow or banded limestone that was quarried 2.5 km. from the side. Each pilaster has a long basal slab supporting a set of rectangular blocks on what rested the superstructure made of mud concrete bricks, which was most likely encased with three wooden planks with their tongues being close fit into grooves that were cut on each top block while the third plank, was, perhaps, fixed into the other two by side angle joints. Likewise, the central pillar, too, has a basal slab supporting a set of square blocks followed by a beautifully carved circular member with concave profile and flattened bottom and top surface. While all these were i also found two dislodged ones, both having convex profile as well as tenon hole provision on either flat surface of each. Plausibly, the shaft of the column was wooden one. Contrarily, the central pillar of the western chamber of the north gate was found missing to be represented now by a robber's pit.

The citadel has yielded an intricate network of storm water drains, all connected to an arterial one and furnished with slopes, steps, cascades, manholes (air ducts / water relief ducts), paved flooring and capstones. The main drains were high enough for a tall man to walk through easily. The rainwater collected through these drains was stored in yet another reservoir that was carved out in the western half of the bailey. Besides, the city has yielded toilets, sullage jars, or sanitary pits. Drains have shown a good variety even included cut-stone ones and pottery pipes.

The other area in which the Harappans of Dholavira excelled spectacularly pertained to water harvesting with the aid of dams, drain, reservoirs and storm water management which eloquently speak of tremendous engineering skill of the builders. Equally important is the fact that all those features were integrated part of city planning and were surely the beauty aids, too, The Hardpans of Dholavira created about sixteen or more reservoir of varying sizes and designs and arranged them in a series practically on all four sides. A cursory

Harappan Sites in Kutch and Saurashtra



preference for colorful clays, e.g., white and pink for plastering nearly all the structures whether defensive walls, roads, streets, ceremonial ground, or the walls and floors of private houses. Even roof tops of the houses might have been treated similarly. But, this tradition came to an abrupt end with the end of Stage IIIB and beginning of Stage IV, as if under a royal decree or by a resolute public consensus. At Stage IIIB, the cityscape had attained its fullest growth

Stage IV can be thought of as the middle Mature Harappan. The city was carefully maintained, including the monumental gateways, fortification walls, and the rudimentary drainage system. Of special note in Stage IV is the now famous mosaic inscription of ten large signs of the Harappan script

Harappan Sites in Kutch and Saurashtra!

found facedown in a chamber of North Gate in the

1989-90 excavation season. These signs in the InNorth Gate in the 1989-90 excavation season. These signs in the Indus script are madelate Mature Harappan something like the Late Peof a white crystalline material. Each letter is about 37 cm high and their width ranges
dus script are made of a white crystalline material. riod at Mohenjodaro, the time after which the Great
from 25 to 27 cm. It is supposed that these signs had once been set on a board, probably
Each letter is about 37 cm high and their width Bath
ranges from 25 to 27 cm. It is supposed that these
had been abandoned. Following Stage V,
of wood, displayed over the gate. It may have proclaimed some name or title of a chief there was a temporary desertion of the site apparto make visible throughout the city. Or, perhaps it contained some sacred message,
signs had once been set on a board, probably ofsymbolically purifying those who passed under it. In that sense, it may have been ently for a few decades.
wood, displayed over the gate. It may have pro quite often used for their magical, healing, protecting, The following Stage, the Stage VI, presents or purifying properties throughout India.


A large signboard found near one of the city gates of Dholavira

The sign included a circle divided by six radial lines, thought by many Indian scholars, prone to connect the Indus Civilization to the current Indian culture, to be equivalent to claimed some name or title of a chief - the wheel of the Law - a symbol used in Buddhism to denote the concept of *dharma*. The same symbol is associated by them with the to make visible throughout the city.
chakarvartin, "the universal king", and the sun. This symbol is, however, quite

Or, perhaps it contained some sacred
common in the Indus script and is found inscribed on the seals found at various
message, symbolically purifying those
locations throughout Pakistan.
who passed under it. In that sense, it
All the classic Mature Harappan objects including pottery, seals with writing, tools,
may have been equivalent to a man
tra
beads, weights, and other items of gold, copper, stone, shell, and clay are found in ,
or a spell, quite often used for

abundance in Stage IV. Perhaps the most impressive architectural elements are pillars their magical, healing, protecting, or and freestanding columns made of locally available limestone. At least some of the sopurifying properties throughout India.called Harappan ring stones were used in these constructions.

The sign included a circle di

Stage V sees the beginnings of a general decline of the city. The structures in the urban vided by six radial lines, thought by core were not maintained but ceramics and seals, for example, continue in their classic

Mature Harappan forms and styles. We can think of this stage as a late Mature

many Indian scholars, prone to con
Harappan something like the Late Period at Mohenjodaro, the time after which the
nect the Indus Civilization to the cur
Great Bath had been abandoned. Following Stage V, there was a temporary desertion of
rent Indian culture, to be equivalent to

the site apparently for a few decades. The following Stage, the Stage VI, presents the the later *dharamchakkar* - the wheelHarappan cultural tradition, if it can be called Harappan at all, in a form that is widely of the Law - a symbol used in Budseen in Saurashtra to look to the south. The once grand city shrank to a small settlement dhism to denote the concept ofcentered on the 'citadel' and the southern portion of the Middle Town, where a wall of
*dharma*inferior construction (if measured against earlier work at Dholavira) was built. The



. The same symbol is associ
houses show no continuity with earlier buildings and are laid out on a different plan.
ated by them with the *chakarvartin*, This represents the devolution of the Indus Civilization in this region and the once grand **Dholavira - One of the water tanks**"the universal king", and the sun. This
city of Dholavira was transformed into a settlement of minimal diversity without the

Perhaps the most impressive architectural elements are pillars and freestanding columns made of locally available limestone. At least some of the so-called Harappan ring stones were used in these

constructions. The excavation brought to light the sophisticated urban planning and architecture, and unearthed large numbers of antiquities such as seals, beads, animal bones, gold, silver, terracotta ornaments and vessels linked to Mesopotamia. Archaeologists believe that Dholavira was an important centre of trade between settlements in south Gujarat, Sindh and Punjab and Western Asia.

Stage V sees the beginnings of a general decline of the city. The structures in the urban core were not maintained but ceramics and seals, for example, continue in their classic Mature Harappan forms and styles. We can think of this stage as a

the post-Harappan cultural tradition, if it can be called Harappan at all. The once grand city shrank to a small settlement centered on the 'citadel' and the southern portion of the Middle Town, where a wall of inferior construction (if measured against earlier work at Dholavira) was built. The houses show no continuity with earlier buildings and are laid out on

symbol is, however, quite common in
the Indus script and is found inscribed
on the seals found at various locations throughout the Indus Valley.

All the classic Mature Harappan objects including pottery, seals with writing, tools, beads, weights, and other items of gold, copper, stone, shell, and clay are found in abundance in Stage IV. a different plan. This represents the devolution of the Indus Civilization in this region and the once grand city of Dholavira was transformed into a settlement of minimal diversity without the trappings of urbanism.

Dholavira has an impressive walled acropolis ('citadel') with an outer court ('bailey'), both linked to a walled 'middle town', all surrounded by an open walled area within which, on the eastern side, was a lower town, all surrounded by thick perimeter walls. The walls and buildings are made of mud-bricks and stones (sometimes polished) substituting for fired bricks. This unique stone architecture is partly responsible for the preservation of these sectors, all surrounded by gigantic water reservoirs that were cut into the bedrock. Dholavira shows the principal elements of Indus town-planning in its laid-out roads and special attention to water supply through wells and tanks. Cisterns and reservoirs located in the citadel and lower town would have been filled with seasonal rain water. A large reservoir accounting for 17 hectares of the walled areas and another outside the city wall have been identified. The reservoir within the walls is lined with stone blocks reinforced by lime-plaster. It is some 12.8 meters wide and fed by rain weter. It appears that there must have been some additional water reservoirs because it was probably the damming of small rivulets that made cultivation possible on this island to support a substantially large population. Some sub-soil water could have also been available but its significance remains small.

The citadel at Dholavira, unlike its counterparts at Mohenjo-daro, Harappa and Kalibangan but like that at Banawali, was laid out in the south of the city area. Like Kalibangan and Surkotada it had two conjoined subdivisions, christened at Dholavira as 'castle' and 'bailey', located on the east and west respectively, both are fortified ones. The former is the most zealously guarded by a hefty wall and aesthetically furnished with impressive gates, towers, salients and drainage. To the north of the citadel a broad and long ground, probably used for multiple purposes such as community gathering on festive or ceremonial occasions, a stadium and a marketing place for exchanging merchandise during trading seasonss. Further north, there was laid out the walled middle town while to its east was founded the lower town. To the south of the castle, across the adjoining reservoir, there was raised another built-up area running along the city wall, perhaps, designated as annexe or a warehouse

meant for housing the retainers and servants.

Seventeen gates, all built in the fortification walls with equally interesting add-on components, have been exposed so far. Their number-wise break up is: cattle 5, bailey 2, stadiums 4, middle town 1, annexe 2 and the remaining 3 belonging to the late Harappans of Stage VI. Fairly preserved, these bear immense archaeological and architectural significance. Four of them, constructed somewhat, if not precisely, in the centre of each arm of the fortification, were regular gates while the fifth as an additional one in the eastern wall served some specific purpose as the flight of its broad steps stopped just halfway down from the top and did not descend onto the ground outside. The south gate was a concealed passageway leading one through open stairs to an exquisite rock cut reservoir. The remaining three, one each on east, west and north, respectively, shared a few common features which comprised of broad and deep passageway and stairs, a high front terrace and a connected pathway with outward gentle slope.

The north gate was the most elaborate and the most elegant and imposing on a vantage location commanding over sprawling cityscape and enchanting landscape. It had two large and elevated chambers flanking the sunken passageway which in turn was connected to an L-shaped staircase ascending from the inner end. Its lofty front terrace, 6m high and 12m deep, was connected to an equally broad pathway with a slope towards the east where it terminated separately onto a stadiumlike space. The north gate is also remarkable for yielding a spectacularly large inscription made up of 10 unusually big Harappan letters which were surely inlaid on a wooden board since decayed but fairly determinable for its size and shape which matched well with the width of the doorsill of the gate and suggesting thereby that it was originally sported on the façade, right above the door of the gate so as to be visible from afar for its white brilliance.

Of special note should also be the pillars and the pilasters which adorned the interior of the chambers of both east and west gates. Those were mounted on the side walls of chambers for giving support to the respective roofs as well. Each wall had a central pillar and a pilaster at either end, mow represented by their lower members as those were composite ones. These members were skillfully sculpted and smoothened out of bright yellow or banded limestone that was quarried 2.5 km. from the side. Each pilaster has a long basal slab supporting a set of rectangular blocks on what rested the superstructure made of mud concrete bricks, which was most likely encased with three wooden planks with their tongues being close fit into grooves that were cut on each top block while the third plank, was, perhaps, fixed into the other two by side angle joints. Likewise, the central pillar, too, has a basal slab supporting a set of square blocks followed by a beautifully carved circular member with concave profile and flattened bottom and top surface. While all these were i*n situ*, there were also found two dislodged ones, both having convex profile as well as tenon hole provision on either flat surface of each. Plausibly, the shaft of the column was wooden one. Contrarily, the central pillar of the western chamber of the north gate was found missing to be represented now by a robber's pit.

The citadel has yielded an intricate network of storm water drains, all connected to an arterial one and furnished with slopes, steps, cascades, manholes (air ducts / water relief ducts), paved flooring and capstones. The main drains were high enough for a tall man to walk through easily. The rainwater collected through these drains was stored in yet another reservoir that was carved out in the western half of the bailey. Besides, the city has yielded toilets, sullage jars, or sanitary pits. Drains have shown a good variety even included cut-stone ones and pottery pipes.

The other area in which the Harappans of Dholavira excelled spectacularly pertained to water harvesting with the aid of dams, drain, reservoirs and storm water management which eloquently speak of tremendous engineering skill of the builders. Equally important is the fact that all those features were integrated part of city planning and were surely the beauty aids, too, The Hardpans of Dholavira created about sixteen or more reservoir of varying sizes and designs and arranged them in a series practically on all four sides. A cursory estimate indicates that the water structures and relevant and related activities accounts for 10 hectares of area, in other words 10% of the total area that the city appropriated within its outer fortification. The 13 m of gradient between high and low areas from east to west within the walls was ideally suited for creating cascading reservoirs which were separated from each other by enormous and broad bunds and yet connected through feeding drains.

Six of the water tanks, one to east of castle and five of the series to south of it, have been fully exposed while a few others are testified in check digs. The excavated reservoirs are of varying sizes and depth were cut into soft sedimentary sandy limestone. The first two from the east form one unit and the rest the second centrally located tank exhibit genuinely a rock cut architecture. Consisting of both inlying and outlying features, it has a deep basin, an obliquely oriented deeper trough inside, a surrounding freeboard, two masonry flight of steps, an inlet and another rock cut outlet channel. Running parallel to the defensive walls of the castle as well as the city, is a rectangular tank measuring 33.4 E-W and 8.90 to 9.45 m N-S. The deeper level pertains to the trough that was cut in the eastern half of the general basin. It has measured 15.50 m long E-W and 5.65 m across with its vertical sides being 140 oblique to those of the main basin. The neatness with what the tank was cut is remarkable. The weaker veins of the rock were scooped out and plugged with masonry work. The remaining two rock-cut tanks lay further west. All the tanks were interconnected with drain conducting water ione to the other. The surplus water finally flowed out through a masonry drain into another series of reservoirs excavated further west. All these reservoirs like the eastern one became defunct sometime during Stage V.

A cemetery of substantial magnitude has been excavated. It lies to the west of the city and covers a very large area. There are found a variety of cenotaphs which include regular rectangular and circular structures. So far as orientation is concerned, besides north – south, or northeast – southwest oriented structures, there are many which are east – west in longer axis which is certainly not Harappan in character. The most interesting are seven hemispherical constructions two of which were subjected to excavations. These were huge mud brick structures, having a circular plan and hemispherical elevation. While one was designed in the form of a spoked wheel, the other was without spokes. Both the structures were made over rock-cut chambers of large dimensions. Primarily, all sepulchral structures are devoid of skeletons although in most cases, they are furnished with grave goods mainly in the form of pottery. One of the hemispherical structures which has been exposed, has yielded a necklace of steatite beads strung in a copper wire with a hook at either end, a gold bangle, beads in gold foil and other beads, besides specially made pottery. There is a solitary example of a grave with skeleton, with a copper mirror in it. Among smaller graves, there are cists, or cist in a cairn circle, or a circle or half-circle containing number of grave structures. Surely, the Harappans had a composite society having different ethnic / tribal communities following their own practices.

A structure, which has been termed a “bead factory” has been detecte. It is situated in a central courtyard among eleven rooms, a store and a guardhouse: it seems to serve an important economic function There is a cinder dump, as well as a double-chambered circular kiln, with stoke-holes for

fuel supply. Four flues are connected with each other, the upper chamber and the stoke hold. The mud plaster of the floors and walls are vitrified owing to intense heat during work. The remnants of raw materials such as reed, cow dung, sawdust and agate are found, giving archaeologists hints of how the kiln was operated. A large mud-brick building faces the “factory”, and its significance is noted by its plan. Four large rooms and a hall, with an overall measurement of 17.1 x 12.8 meters (56 x 42 ft). The hall has a large doorway and a raised floor in the southern corner of the building.

The foregoing account makes it amply evident that the Indus related cultures in Kutch and Gujarat were constantly evolving in all aspects and developing their distinctive repertoires. Many elements of the earlier settlements were adopted, refined in some cases, elaborated and widely distributed by the succeeding Harappans. It is, however, not known as to how strong these early cultures were and of how these comparative cultural traits interacted with each other and with the Hardpans. Secondly, the arrival of the Harappans was quite sudden and emphatic. Still, the evidence at Dholavira is different because the Harappans of Stage IV almost scrupulously maintained the planning which they inherited from their immediate predecessors. The Stage III demonstrates the early phase of Harappa culture in several different ways.

Lothal: The best-known Harappan settlements in Saurastara is Lothal, where the Indian Archaeological Survey's team under the direction of S. R. Rao revealed a great artificial platform with streets and houses of regular plan, and a series of building phases which have been dated by a number of radiocarbon samples. Besides the township was discovered a remarkable brick-lined basin, probably used to provide a fresh water supply. It is not a large city or a port (as is generally portrayed in Indian aerchaeological circles). In fact it is a small town or a large village, of only 4 hectares. Judged from published maps, the entire site is on the order of 300 by 250 meters. A population of between one and two thousand would therefore appear to be reasonable estimate for it. A settlement of this size is probably best referred to as a town, reserving city for the vastly larger places. Following the hyperbolic account of the excavateor (4), a plethora of articles have appeared that have cluttered the Internet space. These exaggerated and spirited accounts are still appearing *ad nauseum*. The following de



A communal well at Lothal

scription of the site is mainly based on a comprehensive summary by Possehl (5), tempered with the opinions of some other archaeologists.

The site has been divide
d into three architectural areas or "districts": the Citadel, the Lower Town and the Dockyard. The Citadel is an imposing area artificially raised above the remainder of the settlement on a mud brick platform. This area occupies the south-east quadrant of the site and is 48.5 by 42.5 m in size. On the Citadel are streets at right angles to one another, which separate blocks of mud and baked brick structures. One of these blocks, with very thick mud brick foundations, has been interpreted as a warehouse.The Lower Town is also divided into blocks separated by streets, seemingly at right angles and oriented to the cardinal directions. Only six of these blocks were excavated. The Lower Town was used both as residential and manufacturing purposes.

Stratigraphically the site has been divided into five building levels each separated from the others by what the excavator refers to as flood deposits. In the first four levels, numbered I-IV and designated Lothal A, were found ceramics and small finds of Mature Harappan character, while the fifth and the final level, designated as Lothal B, can be termed Late- or Post-urban period. Comparative typology and radiocarbon dates suggest that Lothal A can be dated between 2,100 and 1850 BC, of which level II seems to be the zenith of the Harappn Lothal. The following discussion is limited to the "mature" phase levels II, III and IV.

At its height (Phase II) Lothal was apparently a walled town, rectangular in shape, approximately 1,000 by 750 feet in size, the long axis of the town being north-south. Three quarters of the town was

reportedly devoted to habitations and factories. In the latter category a substantial bead factory for the production of carnelian, agate, opal, crystal, and other stone beads have been found, while a “coppersmith’s house” was also evidenced on the north of the enclosure. The habitation area reflects the usual Harappan block plan with its familiar streets,

lanes, and drains. R.S.Roa, the excavator, describes a bazaar and refers to what must have been ‘comfortable’ living quarters.

The drain of one house has been found to be connected to a wide outside drain, although it does not seem to be a common feature. Some small “sacrificial” pits containing terracotta cakes or round lumps and ashes have also been noticed. A niche found in the roadside face of a house may usggest the placing of lamps in such niches at night. The streets (3.65 to 5.48 m wide) and lanes (1.82 m to 2.74 m wide) were all paved with mud-bricks with a layer of gravel on top. The street drains (internal width 1.21 m to 0.64 m) had a carefully provided gradient, “with screens at their mouth to prevent solid waste from falling in cesspools, one of which was 1.31 m square and about 1.52 m deep”. This claim is, however, contradictory as the author fails to evidence any systematic drainage system beyond one single drainage connection mentioned above.

The excavations uncovered finished products and waste materials from a wide range of natural resources: copper, bronze, gold, carnelian, jasper, rock crystal and other semiprecious stones, ivory, and shell. Many of these materials were associated with a bead-making shop similar to the installation at Chanhu-daro. The bead-making technology at Lothal, as documented by waste materials (beads broken in the process of manufacture and drills), is the same as that used at Mohenjodaro, Mehrgarh, in Baluchistan and Shahr-i Sokhta in Seistan, and has several aspects in common with that of Chanhu-daro.

Present at the site was a wide variety of raw materials, objects in various stages of manufacture, finished products as well as waste and residual materials. Stone anvils, bronze drills, crucibles, slag, remnants of conch shell, copper ingots, whole tusks from elephants (and others partly sawn) are but a partial list of the items relating to specialized crafts. Most noteworthy is the presence of a bead factory in the Lower Town. In this structure several rooms of small size surround a central courtyard. Within the latter there is a raised working platform with an anvil. The archaeological deposits associated with the factory contained many unfinished beads, drills and other tools as well as bead materials and hundreds of finished ornaments. A special furnace for heating carnelian to enhance its color is also a part of the complex. Beads of many forms made from carnelian, crystal, jasper, opal, steatite, paste and the like were manufactured on a very large scale at Lothal, suggesting that this manufacturing process must have been one of the most important activities at the site.

Typical Indus seals and sealings were found at Lothal, most of which were the classic types. A number of more provincial glyptic objects were pre5. Presence of “anchor stones” in the basin.
sent as well. Perhaps the most important of theseRao’s sales pitch to portray this structure as aIndus ‘customs’ are not identical! But Rao is quick
ment of the enclosure, if it was used for docking ships,
was a Dilmun-type seal, which was a surface find.dockyard has met with a hostile skepticism of a largeto itemize benefits that early civilization, originatingis odd. As mentioned before, it is on the side of the setThe terracotta figurines of both humans and ani
number of archaeologists who do not want to buy into*independently*tlement opposite the primary

river access. Thus, ships

in South Asia, has bestowed upon Rao's hyperbolic description of the tank. For instance, would have had to come past the settlement and to mals are simple, even crude, unlike those from Possehl pleads, "it must be emphatically stated that no peoples beyond the Indus. Among some of the inhave made at least one right angle turn in a narrow

Mohenjo-daro or Harappa. Examples of bronzeamount of testimonial, assertion and appeal to intuitionventions he attributes to the Indus Civilization (ofchannel. In fact at one point in Rao's reconstruction two miniature
animals
(bull,
hare,
dog,
and
a
bird
can be considered a replacement for data, fact and
right angle turns are called for. How much more logical
which Lothal is "one of the three great pillars") are logic in the resolution of this question. The issue here is it would have been if the dockyard had been built on the headed pin) were probably cast by the lost wax not whether the structure is or is not a 'dockyard'. It is the compass, the auger drill, and circular saw. Engriver side of the town where an uncomplicated entrance
process. The remainder of the material inventory rather that Rao has not shown it to be, and his uncritical lish
bonding techniques in masonry, cultivation of
would have sufficed. Finally, access over the peripheral
includes typical Indus weights, triangular terra-cottatreatment of the problem only serves to confuse whatrice, standardization of goods and services (butenclosing wall to the interior of the facility is extremely cakes, model terra-cotta carts, and baked bricks.
might be one of the most exciting stories of ancient
shallow. Excavation has shown it to be on the order of
without the threat of individual initiative, he assures
trade and cultural encounter". Lawrence S. Leshnik (6) seven brick courses. This would admit water craft with
Bun-shaped copper ingots have parallels in westernand U.P.Shah (7), are other prominent critics of Rao's us), the origins of Yoga, compassion for animals,
less than a meter draft, probably excluding sailing craft
Asia, but the metal implements are purely Indus inposition. So is also Rita Wright (8) Wright) in passing.and adoration of the fire god, plus a number of spiriappropriate for ocean- going maritime trade, which, accharacter. A small cemetery to the northwest of the The precise function of this brick-lined enclosure cording to Rao, was the *raison detre* for Lothal. tual innovations are also mentioned. The foundation
is open to question. No conclusive demonstration of its *Lothal: a Port City? A Transition Station? A Hub* site contained a number of interments, twenty ofuse as a dockyard has been made, and there are imof marine engineering in the world is enshrined at*of the Harappan Overseas Trade?* This is one of the
which were opened. This important feature of Lothal portant critics that suggests that it is a simple Harappan the

dockyard at Lothal. Archaeologists may have
most blatant claims that Rao has made as a result of
is discussed later in this book along with the other tank for storage of water. It seems that neither of thesedifficulty in accepting these claims for one-way culhis archaeological discoveries at Lothal. It has gained
human remains of the Indus Civilization.
alternatives is fully convincing. There is serious ques
so much currency in South Asian archaeological litera
tural diffusion from "India". There are a few claims,tion as to the necessity of a tank for irrigation water in ture that
Lothal is invariable qualified as "Lothal - a port
Lothal - a Center of Controversies: Thethe Lothal area. Seasonal inundation is sufficient for
incessantly repeated by Indian as well as the west
city". The idea gained credence because a seal of the
Harappan nature of the Lothal settlement is not inone crop and ground water is extremely close to theern scholars and laymen, need examination.type made and used in contemporary Bahrain was
doubt, nor is there any misgivings about the shell,surface at other times of the year. The means of lifting
water from the tank has yet to be explained. Leshnik (6)
found on the surface of the Lothal mound. The seal was

A Dockyard? A Wharf? or What? The most an important discovery at Lothal and the excavator, stone, and ivory industry. It is the claims such as suggests the use of a shaduf system, pointing to theremarkable, and frequently sited, structure at Lothal

that "it is a certainty that the Harappans came to
S.R. Rao, and his colleagues used this discovery to

enclosure is a rectangular depression of some size, 220 by 35argue for the central importance of the site in the Lothal for trade or colonizing in 2450 BC" and thatcounter-weights of the shaduf lever assembly. Somemeters, enclosed on all sides by fired brick walls "when their settlement was destroyed, along with

scholars have valid objection that the water in this tank
terms it should be more simply related to the Gulf mer
and connected to the 'acropolis' by a great platform.
would have been contaminated by the town's drains chants' activity in Gujarat.
the Indus Valley cities in the wake of a great deluge,
they
moved
to
and that the local water supplies were perfectly
Rangpur
and
adequate for agriculture without a special res
Bhagatrav".
ervoir. The alternative suggestion is that the
statements are affront to the sensibilities of a stu
structure was nothing but a Harappan water

dent of archaeology and ancient history. Thetank, used for ritual purification, just as that at *Volk erwanderung* that brought the Harappans to LothalMohenjodaro. There are several difficulties to
is conceived of as a sea passage from the Indus. In
The fact that the tank borders one side of
the main, this argument is based on the supposed
the settlement limits its potential for irrigation. It
absence of Harappan sites in the tract betweenwould have been much more efficiently placed
Sind and Lothal (i.e. in Kutch) and the establishhad it been constructed some distance from the
settlement where water could have been drawn
ment of a relative chronology that claims absolute
for field all around. There are no stairs or other
priority in the region for the founding of Lothal. This
means of access to the interior of the enclo
dating is, however, itself questionable and explorasure. This means that it could not have been
tion of the Kutch area has brought to light a number used for bathing and laundry without much diffi

culty. Finally, there is a well on the ‘loading plat
of Harappan sites there, so the arrival-by-the-sea
form’ between this structure and the citadel.

Such



theory will have to be reconsidered. Admittedly, arWater for use in the settlement would have **Rao’s “dockyard” at Lothal**guments
ex silentio , as are some of the above, dobeen taken from this source and not from the

not bring one far.
open tank. Considerations such as these can **Rao's "dockyard" at Lothal**
be used to at least cast doubt on Leshkin's hy
The principal excavator, R.S.Rao, describes This structure is located on the eastern side of thehis discovery ofpothesis just as his arguments cast doubts on
Lothal
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his
semi
the connection that the sunken bricklined encloOn the "citadel' Rao found some seventy-fivearchaeological books, *Lothal and the Indus Civiliza*site. It is constructed of baked bricks. A platform terracotta sealing bearing impressions of string, knots,
tion. There is a fundamental question as to whether aborders the town side and permits an access to the Unfortunately, however, he seems to be more matting or fabric on one side, and stamped with seals large dockyard would have been necessary, even if"warehouse". Rao calls this structure a 'dockyard'on the other. Twelve of them were struck by the sameinterested in "selling" Lothal than in describing theLothal had been a 'port'. Today ships come into riverine seal; the seals used for stamping the stored parcels of findings in a factual manner. One could go on to
ports on the adjacent Gulf of Cambay and anchor at
and a 'wharf'. Supposedly, ships entering via tidal
cloth or matting were perhaps not local seals because
challenge much of the interpretation and conceptu
high tide on mud flats where they are loaded and unchannels from the Gulf of Cambay were at high tide
none of the steatite seals found in Lothal match the im
alization offered in this piece of zealotry in the name
floated over a gap in the southeastern corner. Brick

201 walls found in 1961 outside the "dock" and alongof archaeology. An "Indus Empire", "genius leaders", "waves of newcomers" and "refugees" are among the many examples of terms which have no ground in factual evidence at all. Surely our author has another word in mind when he writes, "the seafaring merchants of the Indus Valley cities . . . established a small colony at Lothal *ca.* 2450 BC with a view to *refuel* their south-bound ships". Turning to the broader issue of Lothal's place on the sphere of the Indus Civilization, Rao disclaims any significant cultural influence from the Near East. Indeed, even the *idea* of civilization is disassociated from the rise of

high culture in Mesopotamia since Sumerian and loaded without other facilities. In addition, the place

side the channels are regarded by him as means of reducing erosion brought by the fluctuation of the tides. A spillway in the south wall of the dock was equipped apparently with wooden sluice doors set in grooves. Thus, the water level in the "dock" enclosure could be maintained no matter what the tidal level.

There is some evidence that it received sea water but serious objections have been raised to the suggestion of this tank-like structure as being a dock. For example, the approach channel turns twice through 90°, which seems excessively awkward, and the positioning of the dock on the opposite side

of the town from the river also seems to create needless difficulties of access. If it was indeed a 'dockyard', as the excavator S.R. Rao insists, then it could have received only very small boats, since the inlet into it h
ad little depth.

Rao points to some archaeological evidence for the ‘dockyard’ as opposed to a simple water reservoir, such as the followings:
1. No ramp or stairway to reach the water level,

as is present at Mohenjo-daro.
2. “Definite” indication of a “loading platform”
3. The silt in the basin is saline
4. “Post holes” in the enclosure walls, suggesting tie posts for ships.
5. Presence of “anchor stones” in the basin. Rao’s sales pitch to portray this structure as a dockyard has met with a hostile skepticism of a large number of archaeologists who do not want to buy into Rao’s hyperbolic description of the tank. For instance, Possehl pleads, “it must be emphatically stated that no amount of testimonial, assertion and appeal to intuition can be considered a replacement for data, fact and logic in the resolution of this question. The issue here is not whether the structure is or is not a ‘dockyard’. It is rather that Rao has not shown it to be, and his uncritical treatment of the problem only serves to confuse what might be one of the most exciting stories of ancient trade and cultural encounter”. Lawrence S. Leshnik (6) and U.P.Shah (7), are other prominent critics of Rao’s position. So is also Rita Wright (8) Wright) in passing.
The precise function of this brick-lined enclosure is open to question. No conclusive demonstration of its use as a dockyard has been made, and there are important critics that suggests that it is a simple Harappan tank for storage of water. It seems that neither of these alternatives is fully convincing. There is serious question as to the necessity of a tank for irrigation water in the Lothal area. Seasonal inundation is sufficient for one crop and ground water is extremely close to the surface at other times of the year. The means of lifting water from the tank has yet to be explained. Leshnik (6) suggests the use of a shaduf system, pointing to the ‘anchor stones’ of Rao found in the enclosure as counterweights of the shaduf lever assembly. Some scholars have valid objection that the water in this tank would have been contaminated by the town's drains and that the local water supplies were perfectly adequate for agriculture without a special reservoir. The alternative suggestion is that the structure was nothing but a Harappan water tank, used for ritual purification, just as that at Mohenjodaro. There are several difficulties to these assumption also. The fact that the tank borders one side of the settlement limits its potential for irrigation. It would have been much more efficiently placed had it been constructed some distance from the settlement where water could have been drawn for field all around. There are no stairs or other means of access to the interior of the enclosure. This means that it could not have been used for bathing and laundry without much difficulty. Finally, there is a well on the ‘loading platform’ between this structure and the citadel. Water for use in the settlement would have been taken from this source and not from the open tank. Considerations such as these can be used to at least cast doubt on Leshkin’s hypothesis just as his arguments cast doubts on the connection that the sunken bricklined enclosure was a dockyard.
Thereisafundamentalquestionasto whether a large dockyard would have been necessary, even if Lothal had been a ‘port’. Today ships come into riverine ports on the adjacent Gulf of Cambay and anchor at high tide on mud flats where they are loaded and unloaded without other facilities. In addition, the placement of the enclosure, if it was used for docking ships, is odd. As mentioned before, it is on the side of the settlement opposite the primary river access. Thus, ships would have

had to come past the settlement and to have made at least one right angle turn in a narrow channel. In fact at one point in Rao's reconstruction two right angle turns are called for. How much more logical it would have been if the dockyard had been built on the river side of the town where an uncomplicated entrance would have sufficed. Finally, access over the peripheral enclosing wall to the interior of the facility is extremely shallow. Excavation has shown it to be on the order of seven brick courses. This would admit water craft with less than a meter draft, probably excluding sailing craft appropriate for ocean- going maritime trade, which, according to Rao, was the *raison detre* for Lothal.

Lothal: a Port City? A Transition Station? A Hub of the Harappan Overseas Trade? This is one of the most blatant claims that Rao has made as a result of his archaeological discoveries at Lothal. It has gained so much currency in South Asian archaeological literature that Lothal is invariable qualified as "Lothal - a port city". The idea gained credence because a seal of the type made and used in contemporary Bahrain was found on the surface of the Lothal mound. The seal was an important discovery at Lothal and the excavator, S.R. Rao, and his colleagues used this discovery to argue for the central importance of the site in the Bronze Age seafaring trade, although in strictly logical terms it should be more simply related to the Gulf merchants' activity in Gujarat.

On the "citadel' Rao found some seventy-five terracotta sealing bearing impressions of string, knots, matting or fabric on one side, and stamped with seals on the other. Twelve of them were struck by the same seal; the seals used for stamping the stored parcels of cloth or matting were perhaps not local seals because none of the steatite seals found in Lothal match the impressions on the sealings in the "warehouse". According to Rao, this indicates that goods came into the town from elsewhere, marking Walking through the excavated portion of Lothal one has the impression of being in the midst of a prosperous but rather small village of the type still to be seen in Gujarat.

On the basis of a lone seal of Persian Gulf origin, Rao argued for Lothal not only as an important 'seaport' serving the Indus realm but happily discovered a full-fledged 'wharf' where "up to thirty Gulf ships of fifty tons each could dock at one time to support the thriving Indus-Dilmun trade". These propositions have not been uniformly accepted by other archaeologists despite the extensive and sustained propaganda by the nationalist press in India and the Indian expatriates in the USA. It would be futile to enumerate all the reasons for not accepting this flight of imagination; suffice it to say here that in light of later discoveries in Oman and in eastern Iran, the explanation would be on a different, far more entangled, level of historical interpretation. Apart from the controversy of Rao's 'dockyard', 'wharf', and 'warehouse' the claim that Lothal was a port settlement with direct trade relations with Mesopotamia has wide implications. Rao considered Lothal a port even before he discovered the basin. Yet, apart from the basin, there is very little about Lothal that would allow us to recognize it as a trading partner of Ur and Susa. The recovered objects of supposed foreign origin are very few indeed: they include one seal of the Persian Gulf type, a seal impression, some bun-shaped copper ingots, and sherds of a reserved-slip ware said to resemble one from Ur, Brak, and elsewhere. But this ceramic type has now been recognized at several Kutch sites, among them inland locations, so that it cannot be accepted as evidence for unique Lothal contacts with the West.

Lacking any analogies from Indus Valley or from South Asia in general, Leshnik (6) asks: "in what frame of reference is one to conceive the nature of an Indian port of the third millennium BC? Granting that some trade between the Harappan and Mesopotamian peoples is established, and that both civilization were part of an ancient 'world trade system', the Mesopotamian example should prove instructive. In Sumer, docks were not merely places where merchandize was transferred to and from vessels, but the actual centers of commercial activity as well. Goods were exchanged and sold at the quay, for which purpose merchants had permanent establishment. At Lothal, by contrast, nothing of this is evident; on the contrary, the basin is integrated into the settlement by its very proximity to

the main residential area. That the Harappans otherwise divided their cities into sections is abundantly clear at Harappa, and several other sites. At the least, it seems that the Harappan port had a different appearance from that of its Mesopotamian trading partner, but a likelier inference is that Lothal was not an emporium of the kind Rao envisages at all". Rita Wright (8) questions the Rao's proposition on the size of the settlement. Judging by its size (only 4.5 hectares) Lothal does not even quality for being a city. It was merely a large village or a small town, at par with several Indus settlements, such a Chanhu-daro (4.5 hectares). How could a population of merely 1,000 to 2,000 could support the fantastic sea trade (in addition to even more fantastic craft activities)?
The warehouse, or the granary, it is noted in passing, occurs as a fairly regular feature of Harappan settlements and is therefore not pertinent to the argument here. In their turn, neither do the small finds encourage the view that Lothal was a center of International trade. The identifiable objects from overseas can be counted on one's fingers. The controversy about the 'dockyard' is unfortunate. But, whether it is or is not a "dockyard" or it is a simple water tank makes little difference in terms of this settlement's place in the cultural geography of the Indus Civilization. In spite of the smallness of the site, the doubtful archaeological data, and the advocative analysis of the excavator, Lothal seems to be an important and quite significant Harappan site. There is no doubt that, even without a dock and a 'warehouse' Lothal could have been engaged in coastal trade. It surely defines the eastern boundaries of the Harappan Civilization. *An Entrepoprt?* Possehl (5) argues that Lothal was an entreport, a settlement of entrepreneurs interested in the procurement of raw materials demanded by the inhabitants of the cities and towns of Sindh and the Punjab. To facilitate this process of acquisition, they formed an alliance, an exchange relationship, with the hunting and gathering peoples on the south-eastern borderland of their civilization. Seasonal mobility plus an intimate knowledge of the resources available within the regional environment made these hunter-gatherers efficient partners in the overall acquisition process. Possehl, however, does not say what raw materials were in Gujarat that were needed by the Hardpans in Sindh and Punjab but were not available in their immediate neighborhood? This proposition also begs the answer to the question: How an advanced society trades with a primitive population without affecting them culturally? Possehl apparently invokes the existence of a caste system, at par with that existing in the present-day India, that inhibited such a change. "Without making the undue claim that the discussion of the relationship between the Harappan civilization and hunter-gatherer groups in Gujarat charts the beginning of the caste system, it

Harappan Sites in Kutch and Saurashtra**!**
can nonetheless be suggested that the developfrom Lothal and Kalibangan. In other words, the
finger millet. For some archaeologists, Surkotad is a Harappan fortress rather than a
ment of a complex and integrated cultural mosaic Harappans did not establish a settlement in Surko
regular crop-raising village. What is of interest is that no special or abundant weaponry

has its roots in prehistory and that such conditions tada in the earliest phase of Harappan maturity but are wholly congruent as a precondition to thehas been found; it is the cleverly planned entrance into the enclosed settlement that did so almost towards the end. The site of Surkogrowth of caste institutions in later historical conspeaks loudest of military defenses, if it does. tada was occupied for a period of 400 years with no texts. This is, in fact, the larger significance of the breaks or desertions. The Mature Harappan traits

discussion at hand and one, which deserves a
The plan of Surkotada is almost similar to the conventional plan of any other Mature lingered on at Surkotada up to 1700 which chrono

Harappan settlement: a fortified complex with a clear walled division inside between the
greater attention in archaeological research" (Poslogically is quite remarkable. Mature Harappan prinsehl 1979).
non-residential and residential parts. Before building the complex, the ground level was
ciples were being followed in Surkotada long after raised by rammed mud deposit, about 1.5 m high in the non-residential section (the
Surkotada: Surkotada is a smaller settlethe civilization itself had started declining and most ment on the western margins of the Little Rann. It is
'citadel') and 0.5 m high in the residential area. Thus, the non-residential section had a
others cities had decayed or died out.
not surrounded by modern cultivated fields as is higher elevation than the residential one. The citadel area measured 60 m square but theAs of today there is no evidence of a city Lothal. Near the site is a *nala* that flows into theexact area of the residential part has not been determined. The 7 m wide fortification scale settlement near the citadel complex of Surko
Harappan Sites in Kutch and Saurashtra!
Little Rann, a water course that is seasonal today
brick houses but that some of its population also
but may have been perennial in the third millenseems to have lived outside the fortified area in
wall enclosing the citadel area was made of mud and mud-brick, with a rubble cover ontada, as one might be expected on the lines of Mohenjo-daro and other Harappan cities. Aboutthe outside and mud plaster on the inside. Its eastern side was provided with a buttress nium. Bones of the onager, nilgai and antelope havethe lower southern half of the settlement that has of mud-brick with rubble cushioning at a later stage. The wall around the residential 500 m (1,600 ft) south-east of the citadel, there is a
not revealed any fortification as yet.
been found at the site, and special amongst the low mound which represents some sort of small
section was only 3.25 m wide. The main entrance to the nonresidential section was in
botanical remains are seeds of foxtail millet, and habitation but the Harappan vestiges are scarce.
Studies have revealed that the people of Galo the south, with an opening to the residential section to its east. No inner structural ragi or finger millet. For some archaeologists, SurDhoro manufactured several craft items of shell,
Archaeologists feel that the possibility of the exiskotad is a Harappan fortress rather than a regular complex is worthy of notice here. There is a burial ground to the north-west of the
semiprecious stone, faience and copper, besides tence of a large settlement is remote but cannot be fortified enclosure.
stockpiling and distribution of various raw
crop-raising village. What is of interest is that no ruled out.
materials like variegated jasper and shell to other
special or abundant weaponry has been found; it is Artifactual remains are meager: painted pottery with Indus type scribles painted on the A small but important craft
Harappan workshops. One of the most important
the cleverly planned entrance into the enclosed setpots, chert blades and copper objects. A typical Harappan seal has also been found. A and trading town of Harappan civilization in Kutch
craft activities pursued with great vigor at the site
tlement that speaks loudest of military defenses, if it piece of charred rope adds to the variety of the finds. Bones of the onagar from thehas been excavated for 8 seasons since 1996. The
does.
was the production of shell bangles from site is locally known as Gola Dhoro and it is situated

Turbinella earliest levels are the other important “discovery” in that they have been claimed by The plan of Surkotada is almost similar to the half a kilometer northeast of a sleepy village of Ba discoveries associated with this craft was thesome Hindutva Indian scholars to be those of a horse, a claim rejected by almost all
conventional plan of any other Mature Harappan gasra. Studies have revealed that the people of recovery of a rectangular mud brick structure serious archaeologists of international repute. Other important finds are a heavy copper settlement: a fortified complex with a celar walled Gola Dhoro manufactured several craft items ofchisel, a hoard of copper beads and bangles, and terracotta toys.
measuring approximately 5.60 x 3.20m with an
division
inside
between
the
adjoining chamber, situated on the northwestern non-residential



and

peripheryGola Dhoro inside the fortification. Within this

residential parts. Before building the complex, the structure three large heaps of shell resting against ground level was raised by rammed mud deposit, the western wall, containing thousands of mostly A small but important craft and trading towngated jasper andofabout 1.5 m high in the non-residential section (the unused shell of *T. pyrum* were uncovered. In

‘citadel’) and 0.5 m high in the residential area. Harappan civilization in Kutch has been excavated for 8 o t h e r between the two shell heaps, thousands of
Thus, the non-residential section had a higher eleseasons since 1996. This work has outlined theHarappan work
unfinished and finished shell circlets and large

vation than the residential one. The citadel area importance of such smaller settlementsshops.areOne of thequantities of micro shell wasters produced during that far measured 60 m square but the exact area of theremoved from the core area situated near specificmost important craft residential part has not been determined. The 7 m below the bangles, are really unique finds andresource areas, in the economic development of the activities pursued wide fortification wall enclosing the citadel area was undoubtedly indicate it being a shell workshop ofHarappan civilization. with great vigor at

Harappan times.
made of mud and mud-brick, with a rubble cover on the site was the the outside and mud plaster on the inside. Its eastthe preliminary studies it appears thatThe site is locally known as Gola Dhoro and it isproduction of shell
From

ern side was provided with a buttress of mud-brick manufacture situated half a kilometer northeast of a sleepy village of bangles from *Turbi*with rubble cushioning at a later stage. The wallbasically *nella pyrum*. One ofBagasra. The settlement measuring 1.92 hectares is

around Th.e residential section was only 3.25 m
remains one of the larger Harappan shell banglethe

about 7.50m high from the surrounding fascinating diswide. The main entrance to the nonresidential sec
manufacturing centers in Gujarat. Not only the
area.
Archeological excavations suggest that the settlement coveries associated
tion was in the south, with an opening to the resi
bangles but perhaps also some raw shell and
with
got its start perhaps from
a small farming village.
this craft was especiallyA Harappan seal from Gola

dential section to its east. No inner structural com
plex is worthy of notice here. There is a burial
ground to the north-west of the fortified enclosure.



Hafted copper tools from Gola

Some hafted copper tools from Gola

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Some hafted copper tools from Gola Dharo
Dharo

species were the recovery of aDharobeing traded from the site, previously believed to Subsequently a massive fortification wall measuring rectangular mudhave been obtained from Oman 5.20m in width was built in three successive stages on brick structure

manufacture inlay in core area

The mound was discovered in 1964 by J.P.

A large number of tubular beads and a few
Joshi of the Archaeologgical Survey of India (9).
bangles of faience were recovered from the site.
The mound is higher on the western side and lower The local manufacture of faience from the site

measuring approximately 5.60 x 3.20m with an adjoining

on the eastern side and has an average height of 5comes from the recovery of large number of chunks of white rock quartz that may have chamber, situated on to 8 m (16-26 ft). In the ancient days, a river 750 m been the basic source of silica powder used in the faience production. The areas the northwestern periphery inside the fortification. (½ mi) wide flowed past the north-eastern side of
the site. This river, which emptied into the Little

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Rann, might have been an important reason for
siting the town here. Now this river is only a small

water stream.

The chronology of the occupation of the site at Surkotada can best be described as Late Harap pan. The dates here are later than most Harappan sites but conform well with the occupational dates
Within this structure three large heaps of shell resting against the western wall, containing thousands of mostly unused shell of *T. pyrum* were uncovered. In between the two shell heaps, thousands of unfinished and finished shell circlets and large quantities of micro shell wasters produced during cutting of the shell, and a grinding stone resting below the bangles, are really unique finds and undoubtedly

shell, semiprecious stone, faience and copper, be

sides stockpiling and distribution of various raw ma



terials like varieindicate it being a shell workshop of Harappan times.

From the preliminary studies it appears that except for limited ladle manufacture from *Chicoreus ramosus*, the settlement basically remains one of the larger Harappan shell bangle-manufacturing centers in Kutch. Not only the bangles but perhaps also some raw shell and especially *Fasciolaria trapezium* species were being traded from the site, previously believed to have been obtained from Oman for the manufacture inlay in core area.

A large number of tubular beads and a few bangles of faience were recovered from the site. The local manufacture of faience from the site comes from the recovery of large number of chunks of white rock quartz that may have been the basic source of silica powder used in the faience production. Some hafted copper tools from Gola Dharo associated with the production of silica powder are mostly associated with intense burning and whitish powder and are confined to within the fortified area only.

Another important craft activity carried out at the site was stone bead production. The majority of the evidence of this craft comes from the southern half of the settlement outside the fortification wall. Though at present we are not able to claim to have discovered the workshop, but we are hopeful that further excavations at the site may yield fruitful evidence. This craft at the site is represented by large number of stone beads, also found in various stages of their production. The assemblage associated with stone bead production also include tapered cylindrical drills made on chert, jasper and chalcedony and constricted cylindrical drills made on a rare form of metamorphic rock that is referred to as "Ernestite" for drilling hard stones.

Compared to the small size of the settlement the number of copper objects recovered is very high, which includes a copper vessel, containing eight bangles and an axe perhaps stored for recycling the precious metal, besides a variety of other copper objects. One of the important idscoveries from southern half of the settlement outside the fortification is the recovery of unique copper knives with bone handles or protective sheath meant to protect the sharp working edge of the tool. A unique copper battle-axe is also a very interesting find from this area, the small size of the battle - axe perhaps suggesting some ritualistic function. These unique copper knives were recovered in association with large quantities of animal and fish bones and at present we are trying to understand if these knives had any functional relation with butchering and preparation of the fish for drying etc. It is very rare to come across such unique knives with wellpreserved handles or covers, hence throw up a challenge for archaeologists to conserve them as it is.

No evidence of copper smelting has been found from the site. However, recovery of a few heavily sand tampered clay crucibles with copper adhering in them, perhaps point to the fact that they were used in melting the copper. Many of these copper objects were perhaps made at the site using sand molds that would leave very little or no traces for the archaeologist.

One of the steatite seals discovered this season has decorative linear patterns incised on three sides and a deep, scooped out rectangular socketlike cavity on the fourth side. It appears that originally it perhaps had a sliding lid to cover the socket. These are in addition to the usual engraved inscription and the unicorn figure on the seal and therefore it is a unique seal, not reported from any other Harappan site so far.

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The Harappan "Port" at Lothal: View, American Anthropologists,

on the ground but is broadly indicative of a transition zone between two major geographical entities. This tends to denote sections where the influences from both the flanking geographical areas have been historically operative. On a general level, as Possehl defines the term, these cultural frontiers are basically 'interaction zones'. Harappan Civilization - The Material Culture

Theoretically, such interaction zones – areas of geographical and cultural transition –

Chapter 10.are available all along the northwestern, southwestern, northeastern, and southeastern

political boundaries of Pakistan. But, not all these zones have been historically

The Neighborhoodsignificant to an equal extent. From the point of view of Pakistan’s ancient history, it is

the western frontiers which are most significant, although in its later history eastern frontiers also became important. A significant cultural and economic interaction zone around the Persian Gulf first becomes manifest in the early third millennium BC. These areas, although “borderlands” in a larger sense only, later acquired an increasing significance in the development and sustenance of the Harappan Civilization.



It is certainly instructural transition – are available all along the north**The Neighbors to the West and the Northwest:**
tive to ponder over the
Detailed archaeological research of the past century
and the results of some recent studies show that during

western, southwestern, northeastern, and southworld within which the eastern political boundaries of Pakistan. But, not all Harappan Civilizationthe Indus Age there existed a unique interaction zone inthese zones have been historically significant to an

a part of the world that can be called "Middle Asia":
flourished. Who were equal extent. From the point of view of Pakistan’s

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other peoples in the regions between the Indus and the Mediterranean.ancient history, it is the western frontiers which are neighborhood atOf particular importance in this vast Middle Asianmost significant, although in its later history eastern

time? What was world, at least to the Harappan s and their ancestors, isfrontiers also became equally important. In addition the region of Turan which is the southern part of the
their culture? How did to the interaction zones on the west and the east, a area generally known as Central

Asia, and north-eastern rim of Iran which runs from
it differ from that of the
Indus people? Who were the people with whom the
significant cultural and economic interaction zone
Meshed in the northeast to Zabul and Zahidan in the Iranian Siestan. Equally important, became manifest
around the Persian Gulf in theor even more so, is the area what is generally known as Central Asia. This region
Indus people interacted intimately and who were the early third millennium BC. These areas, although comprises of Afghanistan
and the region to its north: Turkmenistan, Uzbekistan,
ones to whom they remained rather indifferent?

Tajikistan, Kyrgistan, and the Turkestan region of China. Then, of course is the age-old "borderlands" in a
broader sense only, later ac Fairservis (1) and Wheeler (2) have dealt quite ex
tensively with this subject. Some additional material
has also become available and Possehl (3,4), and
Wright (5), among others, have dealt with this ques
tion more recently. A detailed account of the Bronze
Age cultures in Central Asia is found in Dani and
Masson's *History of Civilizations of Central Asia*
and a recent account of the Iranian Bronze Age
comes from Mortazavi (24). Ratnagar (6), among
others, has dealt with the Harappan relations with
the Gulf. The contacts with the east, i.e. the
present-day India, were, however, nominal, limiting
to the borderline areas in the Indo-Gangetic Divide
and Kutch and Saurastra, into which the Indus Civi
lization, in its old age, eventually expanded and
then wilted.

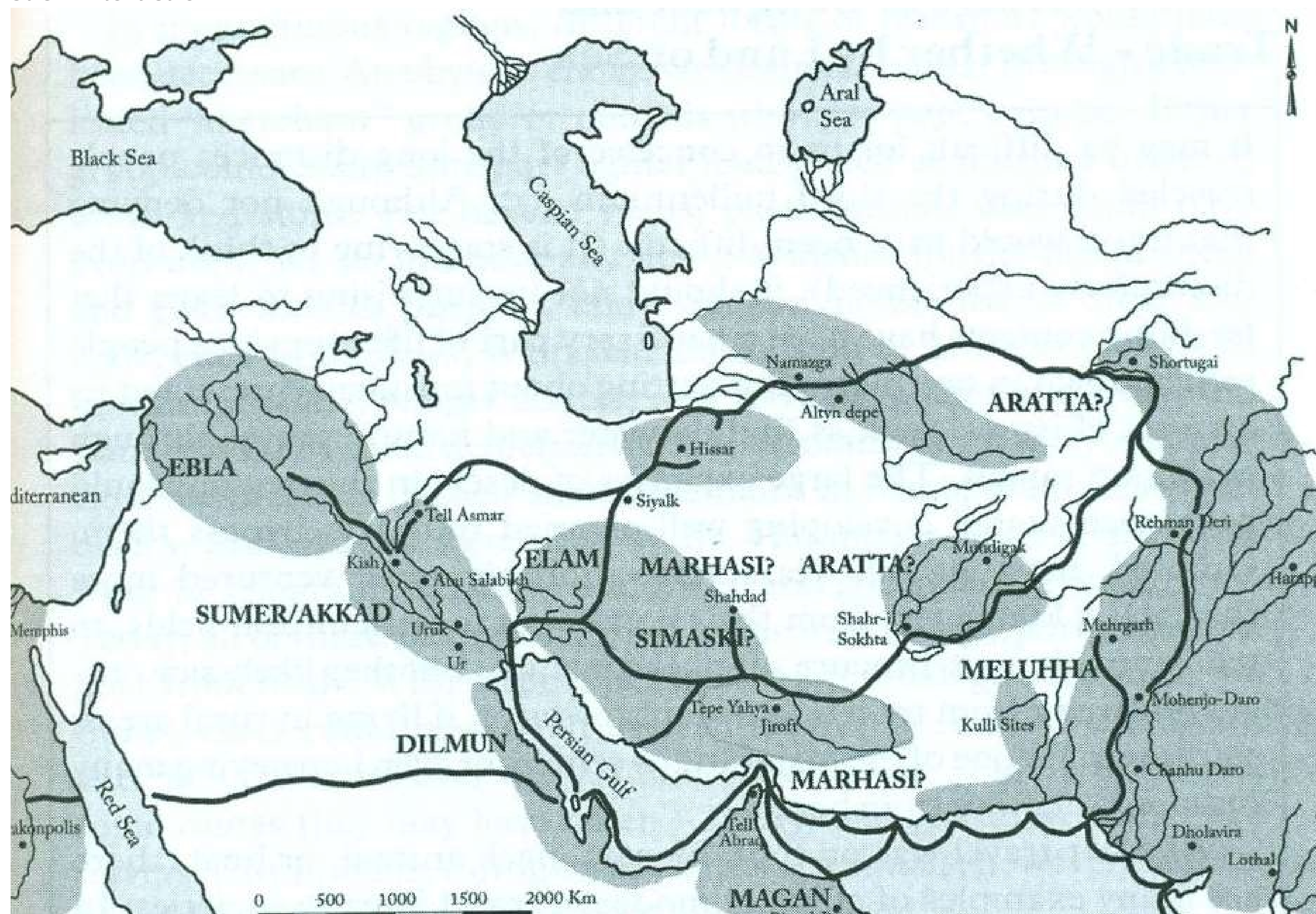
In the previous pages the importance of
quired an increasing significance in the development and sustenance of the Harappan Civilization. This chapter deals with these cultural and economic interaction zones and discuses the nature and extent of cultural contacts of the Indus peoples with those of these regions.

Indus forays outside of its sphere of influence were extended over great distances. Like many of their contemporaries, the Harpans participated in what Philip Kohl (8) refers to as an "interconnected" and "interdependent" world that extended west to the eastern Mediterranean, including Tran and Mesopotamia, to India beyond the boundaries of modern-day Pakistan. Its northern and southern limits were Central Asia and the Arabian peninsula, respectively (5) and both of these regions had a profound influence on the Harappan

geography and environment has been stressed repeatedly in determining the cultural, social, and political borders of the Greater Indus Valley. The fact, however, remains that geography may not be the sole determinant of cultural and political boundaries of a region. Furthermore, the term 'boundaries" and "borderlands" in archaeology and prehistory denotes something wider and more fluid. It reflects a shaded territory which may be somewhat ill-defined on the ground but is broadly indicative of a transition zone between two major geographical and cultural entities. This tends to denote sections where the influences from both the flanking geographical areas have been historically

operative. On a general level, as Possehl defines the term (7), these cultural frontiers are basically tion zones'.

Theoretically, zones – areas of geographical and cul'cultural interac
such interaction



Map of ancient sites in the Near East, Indus, Central Asia, and Arabian Peninsula (19)

culture. While the apparent rationale for this expanAncient Pakistan - An Archaeological Historyhabitants became even fuller participants of the sion was the acquisition of natural resources, it
(southern Central Asia). In the East was western India,

brought with it new ideas and social relations.
especially the Indo-Gangetic Divide; and Kutch and
Saurashtra.The Harappan neighborhood was as digeoverse as its own core area. We are dealing heretouch upon their
graphical features, contemporary cultures, and material
afore-mentioned interaction zone.
Based
on
of the West and the Northwest
archaeological evidence,
was evidently the resultwe of the cultural affinity which the Indus people had de

know that the Indus people interacted with the peo
We shall briefly veloped with the people of this region through trade and
ples of its west right from the onset of the Holocene
exchange since the millennia ago. The actual move
resources. Long distance trade is a broad subject; weand itself a major node of land roads) via Chaman and the Khojak Pass to the Quetta ment of people between this region and ancient Paki
zones, the most important of which are MesopotaHarappan times these traditional relationships in shall take this up in a separate chapter. In fact, the prevalley, and continuing southeastward, through the Bolan Pass, to descend on the Kacchistan must have played its role, culturally as well as ge
mia and the Gulf; southeastern Iran; northern Iran, tensified and their geographical scope increased

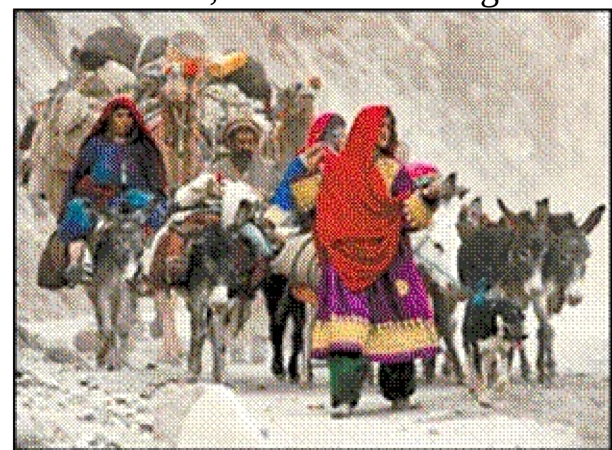
sent chapter is backdrop for that discussion. plain on the frontier between Baluchistan and Sind. As we saw in the *Prelude to* and southern Afghanistan; northern Afghanistan and manifold. These relations were sustained through and Turkmenistan (southern Central Asia). In the *Civilization*, it cannot be a coincidence that Mehrgarh, the first known agricultural East was western India, **THE NEIGHBORS TO THE WEST** and itself a major node of land roads) via Chaman and the Khojak Pass to the Quetta Gangetic Divide; and Kutch and Saurashtra. We

pansion into these areas and the concurrent Euro
situated on the Kacchi plain and
Detailed archaeological research of the past valley, and continuing southeastward, through the Bolan Pass, to descend on the Kacchi shall briefly touch upon their geographical features, pean colonization of the subcontinent. This active gives evidence of domestication plain on the frontier between Baluchistan and Sind. As we saw in the *Prelude to* contemporary cultures,century and the results of some recent studies show
Civilization
material
resources.
of plants and animals that would, it cannot be a coincidence that Mehrgarh, the first known agricultural that during the Indus Age there existed a unique inter
Long distance trade is a broad subject; we shall
action zone in a part of the world that can be called settlement of the subcontinent, is

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Seasonal migration of central Asian people in and out of modern Pakistan

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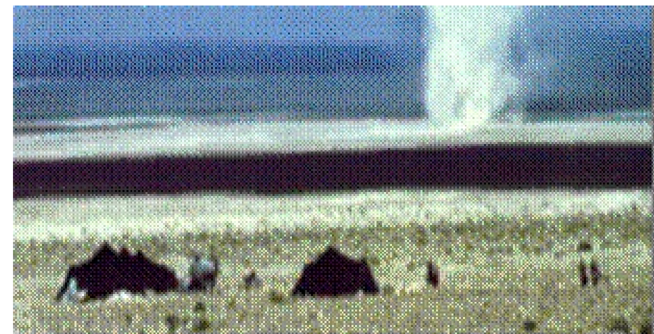
and economically, as well as to a large extent culperiods it was politically fragmented, a process subject It is generally agreed that the developments in Central Asia from the Neolithic to the third millennium B.C., the brickpolitical borders of Pakistan, Iran, and Afghanistan.to both internal and central and west Asiatic factors. It is Bronze Age ran somewhat parallel withparticipation of the Harappan people with those ofthose in the Greater Indus Valley. Villages
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Seasonal migration of central Asian people in and out of
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well as stone tools, began to appear, roughly correof Pakistan, Iran, and Afghanistan.sponding to the time-span between 5000 and 3000 B.C,**Bronze Age Iran:**wheeled Not much has been writand

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in Southeastern region of Iran is of particular interest
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The agricultural economy and settled life were established on Iranian territory more or less during the same time period as that in Mesopotamia and the Indus Valley. During the following period, several cultural centers, using copper as well as stone tools, began to appear, roughly corresponding to the time-span between 5000 and 3000 B.C, again corresponding to the copper-bearing cultures of Baluchistan and Sindh. The occurrence of rich mineral deposits favored an early spread of metal objects; ore was not only processed by the local populations but, equally, exported to neighboring countries - to Mesopotamia in the west and to Central Asia in the north. The copper connection of Iran with ancient Pakistan, has, however, not been identified.

We may distinguish several cultural centers in this period of copper-using, mature agricultural settlements. The central regions, including Kashan and Tehran, are best-known from the excavations at Tepe Sialk. Copper pins and beads are reported from the lowermost layers of the site, which also include a developed painted pottery with simple decorative patterns gradually becoming more complicated. Copper implements increased in number and the potter's wheel was introduced. A closely related culture is represented in the lower strata of Tepe Hissar. A distinct center of early agricultural communities was established in Fars; Tal-i Bakun is the best-known site there. Colorful geometric patterns, combined with stylized animal figures is typical of the local artistic style. In general, the cultural ties were mostly oriented towards the west, to the areas of highly developed cultures of Elam and Mesopotamia.

During the end of the fourth and the beginning of the third millennium BC, a number of complex societies emerged in southeastern Iran. Represented by sites like Shahr-i-Sokhta in Siestan, Tepe Bampur in Baluchistan, and Tepe Yahya in Kerman, these societies had adequate access to water supplies or were on the trade routes between south and west Asia. The environment of southeastern Iran played an important role in the economic development of these early sites. Additionally, the rapid socio-economic growth of Mesopotamia and the increasing demand for goods in this period led to a marked increase in the mining of semi-precious stones in the area, generating stone carving industry on one hand and lapidary works on the other hand. Almost all population centers developed along similar lines at this time (although some variation occurred based on the availability of local resources), and they formed a highly homogeneous cultural entity during the third millennium BC. In this respect, they resembled with the cities and towns of the Indus Civilization with whom they had close but sporadic relationships. Judging from the Indus artifacts, found at these sites, especially the steatite seals and beads of various types, a rudimentary exchange system between the Indus Valley and southeastern Iran ensued between these settlements and those along the Makran coast.

The complex societies of southeast Iran, which emerged during the end of the fourth and the early third millennium BC, experienced a rapid development. They exploited their locally available resources very effectively and established links with the civilizations of Elam and Mesopotamia in the west and the Harappan Civilization in the east (26), developing advanced craft techniques that resulted in new luxury goods which were highly valued by the local elite (27). These societies not only functioned as a connection between the east and the west but also achieved a degree of urbanization and developed into prosperous redistribution markets (28). There were very strong links with the coast which in the second half of the third millennium B.C. led to a very high degree of integration in the whole of the Oman peninsula, as is documented by the convergences between the pottery of Yahya IVB and that of Bampur IV-VI towards the Umm anNar culture.



Archaeological sites in Iran

For the whole of the fourth millennium B.C., pottery production remains characterized by painted decoration, which in any case is enriched by the addition of naturalistic themes, mostly zoomorphic in nature. The gradual cultural integration into smaller regional organizations does away with the north-south contrasts expressed in terms of red and buff ware. This transformation is made more evident by the emergence of new pottery types related to the improved control over the manufacturing processes, and of firing in particular.

In the third millennium B.C. dwellings consisted of mud-brick buildings formed by rather asymmetrical groups of square rooms. The basic ground-plan was rectangular in shape and covered an area of 90-150 m^2 laid out around a courtyard from which the only door providing access to the exterior opened towards the east. The roofs were flat and supported by a frame of interwoven tamarisk branches on which the roof itself was laid. The latter was composed of woven rush matting covered with a layer of clay mixed with large quantities of straw. At Shahr-i Sokhta access to the ground floor was through the external wall or from one side of the internal courtyard. Furthermore, all the service structures inside the dwellings were made of unbaked clay and bricks - box containers, hearths, square raised fireplaces, horse-shoe domed ovens for bread making, sloping bases of grindstones. The same forms were used throughout the Bronze Age and certainly until the Achaemenid period.

The Bronze Age period of 3000-2500 BC witnessed an accelerated process of urban expansion. A pre-existing trend towards the reorganization of certain manufacturing processes brought the specialists outside the confines of the house to dedicated workshops. These workshops in eastern Iran and southern Afghanistan greatly contributed to the expansion of settlements that were already centers of riverine enclaves during the fourth millennium B.C. Each of these sites had been a main regional center all through the fourth millennium B.C. on the same scale as Altyn and Namazga in southern Turkmenistan in the Turanic region. The effects of accumulation and of the new social order

have been seen to emerge in the subsequent

phase between 2600 and 2400 B.C., which corresponds to Period **III** of the Shahr-i Sokhta sequence in Siestan, to Mundigak IV in southern Afghanistan and to Namazga V in southern Turkmenistan.

At Shahr-i Sokhta, the vegetable foodstuffs consisted of both wild and cultivated plants. The latter obviously included the domestic species of wheat and barley, though fruits such as grapes and melons

were also eaten. The staple diet presumably consisted of graminaceous plants eaten in the form of bread and porridge, which every dwelling had the necessary equipment to prepare, that is, ovens, hearths and grindstones with collecting basins of clay. The large quantities of grape seeds found indicate that grapes were normally consumed in the cities. Although there is no direct evidence, it may reasonably be assumed that there was a flourishing production of grape wine and barley beer. The smart-looking balloon goblets used at Mundigak and Shahr-i Sokhta during the period of maximum urban expansion were presumably designed for drinking fermented beverages.Vegetable oil could be extracted from linseed and even grape seeds, although the main source of protein was animal husbandry, hunting and fishing.

The best known protohistoric graveyards in the area are to be found at Shahr-i Sokhta and Tepe Hissar. Smaller groups of graves and isolated burials have been explored also at Mundigak, Turangtepe and in various parts of southern Iran. In the general forms of the funerary ritual a fairly high degree of uniformity exists throughout all these regions, including Baluchistan and southern Turkmenistan. Burials always consisted of inhumation without any prior exposure, the body being laid on one side with arms and legs flexed. The offerings consisted mainly of personal ornaments, pottery and other objects of everyday use, arranged around the body. While at Hissar graves were dug in uninhabited areas of the settlement, between the ruins of abandoned dwellings, in the Helmand area they

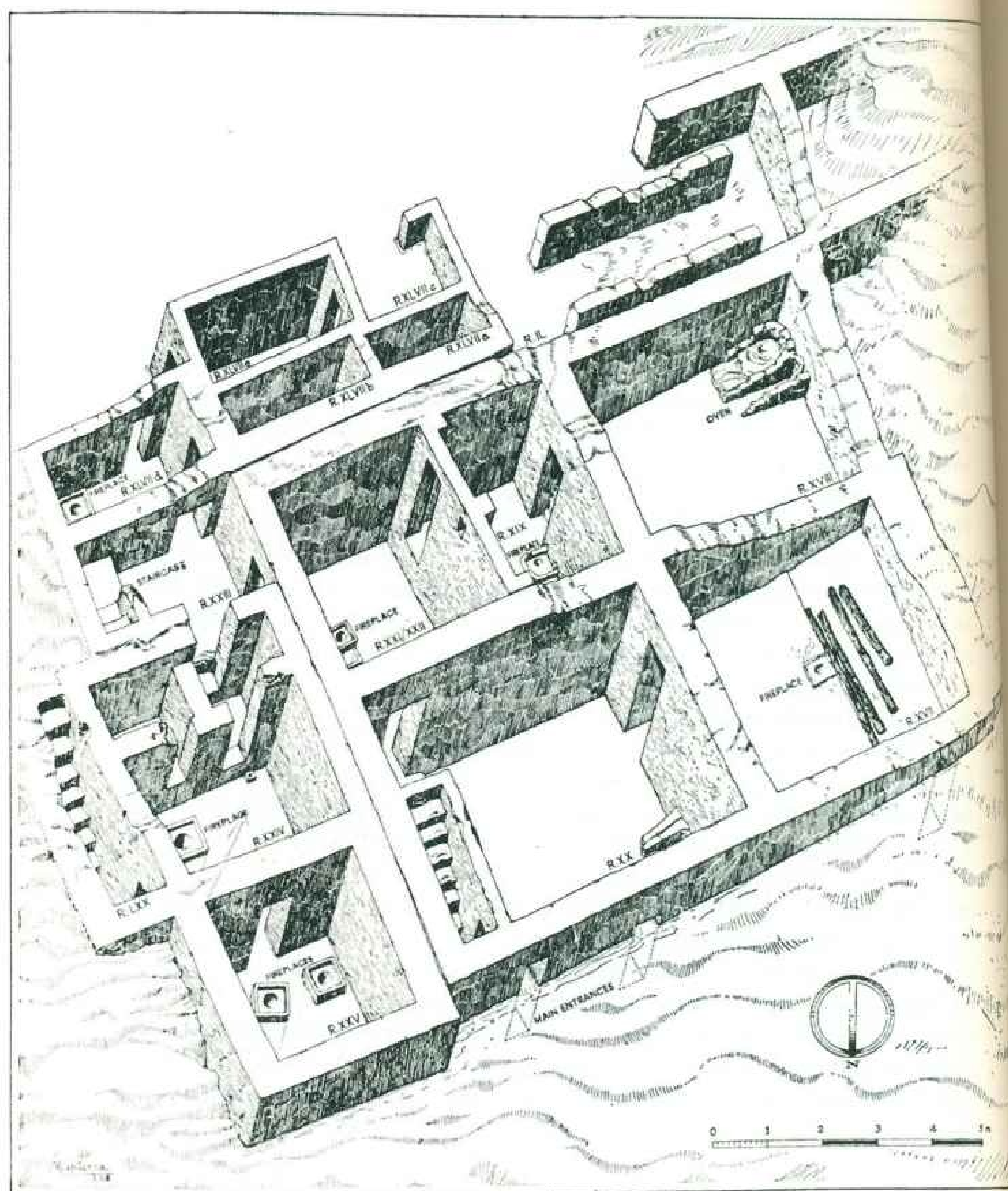


FIG. 4. Shahr-i Sokhta: isometrical view of a house.

Shahr-i Sokhta: an isometrical view of a house.

FIG. 4. Shahr-i Sokhta: isoffietrical view of a house

were kept quite separate from the other areas of the city and confined to 208 cemetery areas of everincreasing size.

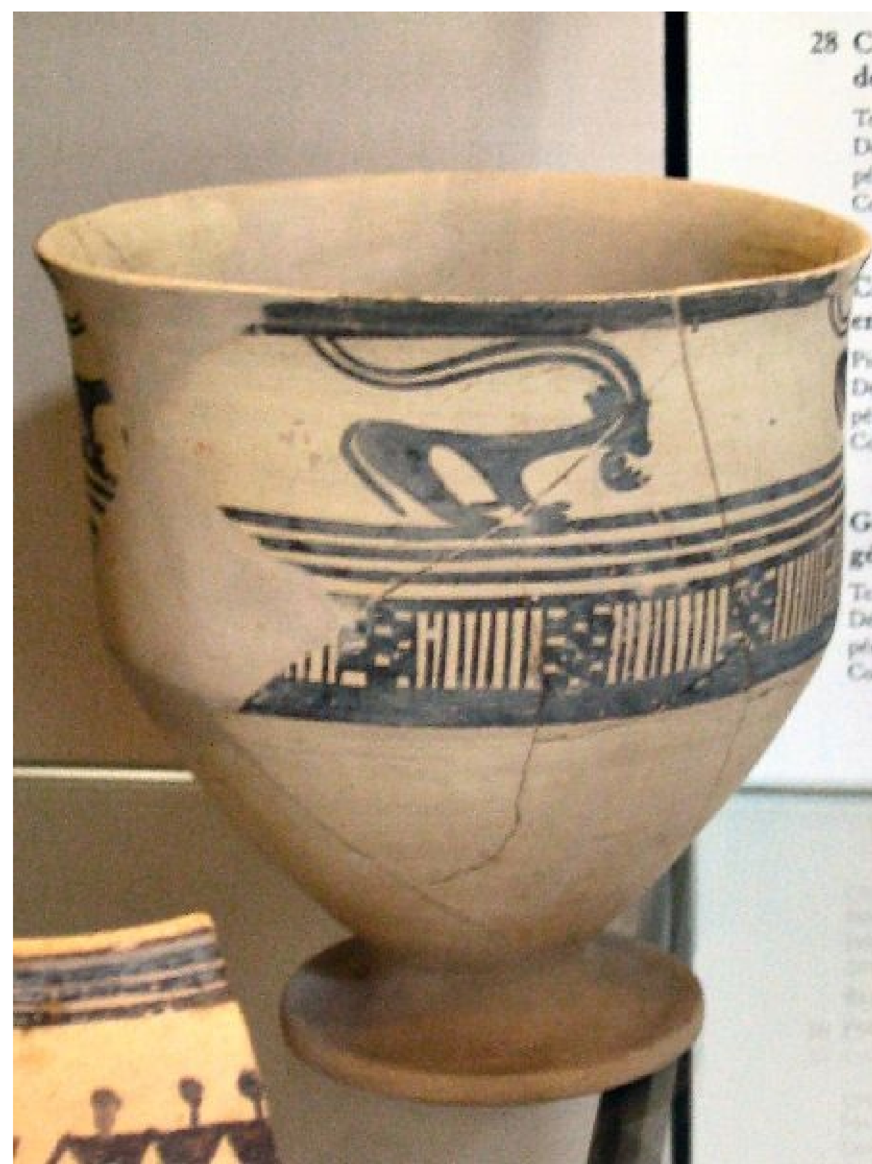
The variability of burial types recorded in the Helmand valley graveyards is related neither to the wealth of furnishings nor to age or sex. In view of the presence at Shahr-i Sokhta of morphologies typical of both the southern Turkmenian Chalcolithic and the Baluchi Neolithic-Chalcolithic, the new urban configuration of cultural tradition is more likely to have been influenced by a convergence of customs and traditions flowing from the two poles. On the other hand, the signs of economic inequality are clearly expressed in the differing degrees of richness of the grave goods.

The few monumental buildings of the Bronze Age so far found in eastern Iran have features in common that, besides allowing them to be distinguished from domestic architecture, are not found in any other cultural area in western Asia. Generally speaking, they were more than 1,000 m^2 in area, compared with the 80-150 m^2 of contemporary private houses. Probably in order to ensure that they would dominate the rest of the city, the monumental buildings were situated on high ground. In the specific context of a protohistorical settlement, the most suitable sites are the elevations left by the accumulation of structures and debris from earlier periods.

In prehistory, Mesopotamia was rich in agricultural resources but not in wood and minerals. Thus, Mesopotamia depended upon other civilizations in the east, such as the Indus Valley and the



A Neolithic period wine pitcher from Zogros mountain in Iran, ca. 5000 BC



A footed vessel with stylistic animal decoration from Sialk, ca, 3000-4000 BC

third millennium BC settlements in southeastern Iran, for metals and semiprecious stones. The rapid socioeconomic growth of Mesopotamia and increasing demand f o r t h e s e l u x u r y

goods facilitated the development of long-distance trade between the Indus Valley and southern Mesopotamia,

mainly through the sea but also through overland routes. Fragments of carved chlorite vessels at Bampur, many semi-finished and broken fragments of elaborately carved vessels discovered at Tepe Yahya, and the presence of abundant fragments of

alabaster at Shahr-iSokhta not only indicate a strong network of international trade between east and west, but also testify to the manufacturing character of the societies that produced them.

There were three primary territories engaged in this longdistance overland trade: Indus cities were the center of production; the cities of Iran (especially in the southeast) acted as intermediaries and small sales markets; and the cities of southern Mesopotamia and western Iran (Elam) acted as the large markets. Of course, settlements in southeast Iran also functioned as production centers in this part of the Iranian Plateau. Many unfinished semi-precious stones at Shahr-i-Sokhta and Tepe Yahya and manufacturing installations at Shahr-i-Sokhta and Rud-i-Biyaban, indicate that they were indeed

production, as well as redistribution centers.

Kohl believes that the chipped stone industry at Shahr-i-Sokhta demonstrates a shared technological tradition that links Shahr-i-Sokhta to Harappan settlements in the Indus Valley (29). Semi-precious stones, like lapis lazuli and turquoise, and marine products, such as shells and sharks' teeth, were the most important materials found at the settlement. The presence of abundant fragments of these stones indicates a strong trade network in which Shahr-i-Sokhta assumed the function of a production area to which raw materials were brought, and from which finished materials were distributed (30). Many geometric stamp seals or seal fragments, countless beads, and several vessels carved from the soft green magnesium silicate, chlorite, which had a broad range of uses, as well as prestige objects, have been discovered at Shahr-i-Sokhta.

During the middle of the third millennium, cont e m p o r a n e o u s with the Mature Harappan Civilization, the manufacturing of lapis lazuli, steatite, alabaster, and diorite increased at Yahya. During the same period, the manufacturing of chlorite, a resource locally available in the mountains closing the valley to the north and west, increased sharply, probably indicating that production for local use was replaced by production for exchange with the urban centers in southwestern Iran and Mesopotamia. Therefore, during this period, Tepe Yahya lay at the center of the trade network for chlorite and steatite (31) and numerous semi-finished, and broken fragments of



An Bonze Age Chlorite stone vessel from Eastern Iran (ca. 2500 BC)



A 8000 years old pot from Rahmatabad Tepe in Fars Province of Iran

elaborately carved vessels, stylistically related to similarly decorated vessels from Susa and Sumer, have been found there.

Cultural contacts between the Bampur Valley and other regions can be illustrated through ceramics, as well. For example, the pottery of certain phases provides evidence of cultural contacts with sites in southern Siestan, and can be related to pottery at Mundigak in southeastern Afghanistan. In addition, perforated vessels found at Bampur are closely comparable to vessels found at Tepe Yahya, from the Kulli-Mehi culture, Shahr-i-Sokhta, and the Indus plains. Chlorite vessels from here have also provided evidence of long-distance trade and samples of chlorite from Bampur and Damin correspond well with the "intercultural style" and probably originated in the metamorphic zone near

Zahedan. Many chlorite vessels have been discovered from the Kulli and the Harappan cultures as well as in Mesopotamia in an Early Dynastic context, indicating contacts between these regions.

The Kulli culture appears to have linked the Bampur Valley with the Indus Valley, but western connections are suggested as well. It has been argued that chlorite from Sumer is more similar to that used east of Yahya, Bampur, and Damin, than to that of the production site of Yahya itself. De Cardi believed that there was a definite break in the ceramic tradition of Bampur. Furthermore, she identified this break as indicating the introduction of a new culture (32) .

The decline in trade between Mesopotamia and the Indus Valley affected the intermediary settlements in southeastern Iran. Shahr-i-Sokhta was cut off from long-distance trade when maritime routes replaced the overland routes. Tepe Yahya and Tepe Bampur, however, remained active until the full decline of trade between Mesopotamia and the Indus Valley occurred. Some archaeologists, such as Ratnagar (6) and Lamberg-Karlovsky (35), believe that It was this occurrence that finally caused the collapse of complex societies in southeastern Iran in the first half of the second millennium BC (33). Although the importance of trade in the emergence of the urban societies of southeastern Iran has been asserted by scholars working in Iran from the seventies onward (33,34), it is doubtful that the volume of trade was such that it could have affected the very existence of southeastern settlements in Iran or threatened the well-being of the Harappan Civilization.

Hemmed in between deserts and mountains, the potential for growth was limited for these early sites and many settlements were abandoned during the first centuries of the second millennium BC. This is the time period when the Indus Civilization itself was also wilting and heading to decline and eventually to its final end. In such marginal areas, there must always have been a delicate balance between the advantages of increasing complexity and the vast investment necessary for its support. Indeed, when collapse or decline occurs due to internal or external factors, investment in complexity, such as the use of surplus to support full-time craft specialists, scribes, or elites, begins to yield a declining marginal return. If these marginal returns decline further, the benefits of complexity for the society as a whole diminish, complex traits are frequently sacrificed, and the settlement reverts to a lower level of socio-economic integration (25).

The dwellings had virtually no wooden furniture or wall niches. The problem of food preservation was solved by using mobile containers: fiber baskets, cloth or leather bags, and pottery, stone and wooden vessels. The exceptionally good preservation of Shahr-i Sokhta has often allowed the discovery of vessels still with their contents of perishable material *in situ*. Grain, which formed the staple diet, was preserved in large pottery jars with a capacity of up to 20 kg of seeds. Store-rooms packed with jars are rare and it is quite possible that from around 3000 B.C. the long-term storage of foodstuffs was mainly provided for by the central administration who removed them from the control of individual families and concentrated them in centralized stores in which they were subject to written registration for the purpose of redistribution. This is, however, a conjuncture; the archaeological finds in Mesopotamia must be weighing heavy on such visualizations.

**A Bronze Age implement found in Luristan Province of Iran**

In context with the Harappan Civilization, eastern Iran is of much more interest to us than the Fars or the Zagros regions. On examination of the situation prevailing in about 4000 B.C., for which the archaeological evidence is more reliable, there can be seen to be three main cultural traditions in eastern Iran and Baluchistan. Of these, only the southern one seems to have consistently embodied influences stemming from south-western Baluchistan as well as Mesopotamia, mostly in the Ubaid period.

Until the introduction of radiocarbon dating to archaeology, most of the connections between the Indus Valley and Iran were concerned with the establishment of a relative chronology as well as an explanation of the development of the Indus Valley Civilization in terms of diffusion and migration of people from the west. Much of the rationale behind these attempts derived from Childe’s argument that all developments of civilization spread outward from the Fertile Crescent.

One of the major problems affecting these correlations was the paucity of excavated sites in Iran and southern Baluchistan. The relationship between the Indus Valley and Iran also occupied the thoughts of Sir Mortimer Wheeler, as evidenced by his article on this subject about twenty-five years after Marshall's excavations at Mohenjo-daro (36). One of the most noteworthy papers of this time was that by McCown and Ross (37) on the excavation of Rana Ghundai, which included a discussion by McCown on chronological and diffusionistic considerations. In this article, McCown postulated the movement of the 'Buff Ware pottery people' from Iran into Baluchistan and the possible importance of this in the development of the Harappan Culture (37).

These migrational and diffusionist arguments, based totally on ware-color, are too simplistic to be accorded much validity today. It is also worth briefly noting here that many of the correlations were based on faulty stratigraphic and chronological contexts (38). Since Wheeler's article there have been many new excavations in the IndoIranian area as well as new and important synthetic works. Wheeler (39) determined the terminal date of the Indus Valley Civilization based on a single seal from Ur published by Gadd. This seal is not actually an Indus Valley seal as was originally supposed but rather a Persian Gulf seal. This in effect disclaims the date of the Indus Vally Civilization.

The development of radiocarbon dating in 1949 provided an important tool for archaeology. The site of Kot Diji was the first South Asian site dated by radiocarbon by the researchers of the Uni- versity of Pennsylvania. Since then there have been numerous dates from diverse sites throughout the Indo-Iranian area. These dates have caused considerable re-evaluation of the chronological scheme of the area. It is apparent that Mesopotamia was not the sole innovative region in Asia and that all ideas and developments did not arise in the Tigris-Euphrates basin. Recent studies and radiocarbon dates, in fact, show that Iranian and Baluchi development in most aspects is contemporaneous with those in

Mesopotamia (51) and that southern Turkmenistan was an important and contemporary force in the Indo-Iranian area (51).

There have also been several recent and excellent studies of the complex chronological problems of the Indus Valley Civilization, the IndoIranian borderland region, the pre-Harap- pan transition, and developments on the Iranian plateau. These studies have shifted to the establishment of a chronological framework utilizing not only radiocarbon dates but complex archaeological assemblages in conjuction with them, rather than single motifs or objects, or radio-carbon dates alone. This important shift has also led to new and more subtle interpretations of the evidence of contact between southeastern Iran and southwestern Pakistan.

The details of the internal and external area chronologies are too complex to be included in this summary but a generalized chronological period from Mesopotamia to the Indus Valley is provided in order to aid in the evaluation of the interaction between Iran and the Indus Valley. It is extremely important to consider the general chronology in order to evaluate the strength of the evidence of interaction and the theoretical considerations of this interaction. It is also important to remember that, based on Mughal (40)), the Early Harappan period, dated at 3000 B.C, culminated in the Mature Harappan sites: This chronological aspect will bear careful consideration in dealing with the theories associated with the diffusion of the concept of urbanization to the Indus Valley from Iran via Baluchistan and in certain aspects from Baluchistan to Iran.

Ceramics have traditionally been used to demonstrate the relationships of the Indo-Iranian area. Marshall notes the similarity of a 'comb' motif found on Indus pottery to those on Susa ceramics. The step-patterns found on Susa I pottery and in the shell work of the Indus Valley constitute another parallel. The Maltese-cross design appears frequently on Susa pottery and less frequently on Mohenjo-daro ceramics. Childe claims Western affinities of pale-slipped ceramics found in Baluchistan and at Mohenjo-daro: connections with Harappan ware and those found at Mehi and Kulli on a style 'which culminated in the Indus style.' Frankfort states that the connections of flattening and elongating naturalistic motifs is parallel to Susa II. He looks to Baluchistan for the naturalism in Elamite art. The Black-on-grey ware found by Stein at Shahi Tump were declared similar to that found at Shahr-i Sokhta I, increasing in Damb Sadat II/III. No potsherd of this type, however, is known from the Indus Valley and yet Stein collected objects 'distinctive of Indian Cultures' at Shahi Tump.

Gordon (41) compiled a vast list of similar decorative motifs found in Iran, Baluchistan, and the Indus Valley. This work represents the most complete attempt at ceramic correlation. Gordon attributes these design similarities to a west-to-east movement of cultural influences into the Iranian borderlands of Siestan and Makran and hence to the Indus valley. Two other patterns that find their way into the Indus valley during the Late Harappan period via Siestan include the cross-hatched concave-sided triangles and the fringe pattern.

The ibex figure, triangular-hatched fringe areas, and trees with fringed branches have been found at Bampur (and later at Tepe Yahya) and are supposedly similar to those of Hissar, Giyan and Sialk. These motifs were felt by Gordon to show connections between Hissar, Giyan and Sialk on the one hand and Kulli and Chanhu-daro on the other. It appears that the palm is replaced by the pipal tree in the east (41). Gordon makes two major statements on the basis of this evidence: that 'there was without doubt an eastwards movement of Iranian pottery motifs via Siestan and Kandahar into the Quetta-Loralai-Kalat area on its way to the Indus'; and that 'with the exception of the bull and pipal motifs the

whole of the repertoire of the painted pottery of the Indo-Iranian area originated in Iran' (41). However, the generalized nature and vagueness of the pottery shapes and motifs mentioned by Gordon as well as conflicting stratigraphic contexts rule out the simplistic single decorative units as a valid proof of migration (38). Gordon's argument that the vast majority of design-motifs found on Harappan wares derived from Iranian sources is also now invalidated in light of recent work by Mughal (42) which indicates the derivation of Harappan ware indigenously. It is also evident that there is a vast and conflicting chronological differentiation in Gordon's correlations when these are closely examined.

Khan (43) attempted to review and elucidate the connections between Iran and the Indus Valley using a methodology reminiscent of the 1940's. However, after stating that 'some of the designs of Harappan pottery resemble those found in Iran, but the majority are different from the Iranian', Khan proceeds to list the similar motifs properly cautioning that 'the simple geometric motifs .do not constitute any proof of relations between the painted pottery of Iran and the Indus Valley' (43).

Lamberg-Karlovsky (44) in a review of the evidence of Indus Valley-Mesopotamian contact, examined the few types of ceramics thought to indicate contact between the Indus and Mesopotamia, e. g. The perforated ware, knobbed ware and reserved-slip ware. Perforated wares are more common in the Indus but also occurring in Iran at Hissar III, Tureng Tepe, Shah Tepe, Yahya, Bampur, and Shahr-i-Sokhta. This generalized type also occurs at Kulli, Awaran, Sutkagen-dor, and at Mohenjo-daro. The variety of stratigraphic context and actual shapes eliminates the use of perforated wares as an effective argument for direct contact (38). The reserved-slip wares are rarely found on Harappan sites: a few pieces from Mohenjo-daro and several from Lothal in a house with other trade-related artifacts. Mughal in 1968 suggested that these potsherds represent the Angira ceramic tradition of incised ware with multiple wavy lines.

It is interesting to note that Quetta ware found at Shahr-i Sokhta, in the Quetta Valley and at Mundigak was used 'as definitive evidence of the eastward spread of buff wares and the designs associated with such wares' (41). Recent analysis by Biscione (45)and Gupta (46) demonstrate the connection of this ware, along with a variety of archaeological material. with southern Turkmenia and the Namazga sequence, rather than the eastward movement from Iran of the Buff Ware people of McCown.

The introduction of reduction kilns afforded higher temperatures and the production of the earliest grey-ware, first appearing in Baluchistan during the Togau Phase, about 3800 B.C. This particular black-painted grey ware actually consists of *porcelaine gres*, fired at a temperature exceeding 1,000° C, as a result of the amalgam between the clay and high percentages of ferrous oxides. It was to continue to be used for another 1,500 years, spreading throughout Baluchistan both over the Indus plain and westward to take in the whole of the Helmand valley in Afghanistan, and Bampur and Kerman in Iran. In spite of this influences from the east and the west, there is no doubt that the urban societies of the third millennium B.C. in Iran are the result of an evolution deeply rooted in local adaptation. The material tools were in place by the end of the fifth millennium B.C. Large-scale investment is evident at this time in the form of extensive copper-mining in central and south-eastern Iran and in complex waterworks designed to make even the outlying areas fertile. The most significant evidence consists of the terraces of Rud-i Gushk near Tepe Yahia.

Metal artifacts have been an important class of objects in the establishment of cultural contact between the Indus Valley and Iran. Marshall states that connections between Susa and Mohenjo-daro 'are best

paralleled by type I bladeaxes.' Mackay refers to the socketed adze-axe found at Mohenjo-daro which is similar to a type of adze-axe with a long collared shaft found at Tepe Hissar, Shah Tepe, Turing Tepe, Shahi Tump, and two ceramic moulds from Mohenjo-daro itself. Mackay also compares a copper pin, 11.4 cm in length, with a lapis lazuli bead set on its top, found at Mehi with similar ones from Susa. This type can be dated on stylistic grounds to the late third millennium B.C. Piggott draws attention to five metal pins or rods with ornamented heads and a mace-head, found variously at Harappa, Mohenjo-daro and Chanhu-daro, which he felt provide evidence for 'trade and folk migrations across the Old World'.

Carnelian beads and Chlorite vessels have also been used to show contacts between the Indus Valley and eastern Iran. Although there are only a few chlorite vessels and a vessel fragment from Mohenjo-daro and Harappa that originate from Tepe Yahya, they provide strong evidence for some type of cultural contact between the Indus Valley and south-east Iran. Mackay also connects the design of an eagle with outspread wings and extended legs on a steatite pendant found at Harappa to a similar one found in Elam. This motif is similar, but not identical, to an incised eagle with spread wings and extended feet found at Tepe Yahya.

There are, of course, many other similar types of metal objects found in the Indus Valley and at sites in Iran, but these can also be attributed to many different eras and locales. It also seems difficult to accept that the Indus Valley Civilization, with a well developed copper/bronze industry at its inception, as well as nearby metal sources, should import or trade with Iran for simple metal objects (47). Lamberg-Karlovsky (48) states that the Indus Valley owes a great deal to Iran for the 'stimulus diffusion in the development of a metallurgical technology and production of similar function tool types.' If this is true, it must take place in an Early Harappan context since the metallurgical knowledge of the Harappan culture is at least equal to if not in some ways more advanced than that found in Iran.

In Conclusion, the archaeological evidence of cultural contact between the Indus Valley and Iran varies in acceptability. Ceramic parallels tend to be generalizations of simple motifs and/or shapes and provide insufficient detail for the establishment of cultural contact. Some of the more individualistic and technically more complex materials can be used more confidently to show contacts such as etched cornelian beads, copper pins with lapis lazuli beads, and the seal-impression from Tepe Yahya.

It is also evident that previous theories of wholesale population migrations and invasions such as McCown's (37) are not acceptable in the light of archaeological evidence. Although emphasis is placed on those artifacts which show cultural contact, it must be remembered that most of the major physical aspects of the Indus Valley Civilization do not resemble their Iranian counterparts, e.g. cityplan, architectural plans and materials, script, metal-tool economic subsistence, etc., except in the most general and vague manner (38). This general resemblance coupled with the few strong artifact connections has resulted in several new and important diffusionist frameworks to explain the cultural interaction between the Indus Valley and Mesopotamia via Iran or through Oman and Bahrain.

Dales (49) has been a strong proponent of an indirect trade network between the Indus Valley and Mesopotamia controlled by middlemen Kulli merchants from Baluchistan. Dales cites the presence of Kulli and other Baluchistan material found at Umm-an Nar as evidence of Kulli trade with the Persian Gulf 'that suggests that they may have been intimately involved in the assumed communications

between the Harappans and Mesopotamians' (50). This theory, while very attractive, has serious shortcomings. The Kulli pottery in Umm-an Nar consists of two vessels with a humped bull on them but without the traditional Kulli landscape. The incised Grey Ware and Black-on-grey ware cannot be limited to Kulli culture only, but rather to an extended cultural sphere of south-east Iran, Baluchistan, southern Afghanistan and Oman .

Lamberg-Karlovsky takes issue with the Kulli merchant theory and states that there is no evidence of Kulli culture at Tepe Yahya or anywhere in western Iran, although one potsherd with a humped bull was found in the 1973 season at Tepe Yahya in a Mature Indus context. Thus, the Kulli merchants could not have been involved in overland trade, particularly considering Dales' excavations at Sutkagen-dor, Sotka-koh and later at Bala-kot.

Lamberg-Karlovsky demonstrated how the excavations at Tepe Yahya, Shahr-i Sokhta, Tal-iIblis, Bampur and Mundigak have necessitated a 'lessening of both the commitment to a Mesopotamian model of urbanization and the adoption of the diffusion of this model to include the Indus and all intervening areas of the Iranian plateau.'

We may briefly summarize here some important points:
(1) Most of the artifact correlations connect Mature

or late Indus Valley sites with late third millennium Iranian periods and sites, e.g. Hissar IIIC, Yahya IVA;

(2) There is little to indicate extensive trade between the Indus Valley and the Iranian sites prior to this time period;

(3) There are substantial indications of trade between Baluchistan and Iran duringthis prior period and between Baluchistan and Turkmenia in the period even before this;

(4) The nature of the Indus Valley Civilization differs substantially, except for vague generalized similarities, from that of the urban sites in Iran;

(5) Recent archaeological work in Iran has eliminated our notion that cultural development in Iran was based on diffusion from Mesopotamia - rather, Iran developed contemporaneously with Mesopotamia and in a different way; and

(6) The chronological time-lag between Iranian urban sites and early Indus urban sites is not necessary large enough to be significant.

The summary of these major points in conjunction with the archaeological evidence and theoretical arguments previously mentioned leads one to the conclusion that outside influence from Iran did not significantly affect the internal development of the Indus Valley Civilization. Rather, it appears most logical to assume that urban development in the Indus Valley is the result of similar processes that led to the development of urban sites in Iran and Mesopotamia. It is not possible, however, at this point, with the evidence available, to postulate what the processes involved are.

Tosi (9) theorizes that because of the desert-like environment and no extensive network of perennial rivers, these cultural centers were like oases. As a result, full functioning of early state economies

during the third millennium B.C. would have been physically feasible only within a range of 50-250 km (9). This is quite unlike the vast, largely coherent, alluvial plains of western Asia and the Indus Valley. The archaeological evidence suggests that, following a period of steady, low-profile economic growth, from 3200 B.C. almost every local society underwent radical social transformation, reaching its peak in about 2500 B.C. when the centers of each enclave had attained their maximum physical expansion and were marked by all the effects of increasing hierarchical complexity. Like Baluchistan, eastern Iran also became the scene of urban and proto-state formation no later, nor less complex, than those emerging around 3000 B.C. along the great alluvial corridors of Mesopotamia and the Nile. Indeed, in the light of our present knowledge, it could be claimed that the protohistoric civilizations of eastern Iran were the third corner of one and the same triangular area of primary development of a state society, lying between the Nile valley, Anatolia and the Hindu Kush.

Afghanistan: The archaeological evidence from the early agricultural cultures in Afghanistan is quite strong. It dates from the end of the fifth to the third millennia B.C. and is the best known in southern part of the country. The main settlements were situated inside the fertile and sufficiently irrigated province of Kandahar (Mundigak, Said Qala, Deh Morasi Ghundai). The three features of an early agricultural mode of life, namely, solid mud-brick houses, developed painted pottery and terracotta figurines are present in the local material culture. Occurrence of rich copper deposits favored the development of metallurgy in this area of Afghani stan. The technique of a closed moulding was mastered not later than the mid-third millennium B.C. The economic pattern favored the concentra tion of population and the emergence of large proto-urban settlements. In this respect, the area paralleled the Quetta Valley of Baluchistan and the Bronze Age settlements of southeast Iran.

Aerial view of Gonor-depe, a key site in the constellation of ancient cities that stretched from northern Afghanistan to southern Turkmenistan, part of the Bactria-Margiana Archaeological Complex, circa 1700 BC.





Mother goddess figures from Mundigak (left) and Deh Morazi Ghundai (center); seated male figure from Mundigak. Baked clay. Third millennium BC

Mother godess figurines from Mundigak (left) and Deh Morasi Ghundai (right), ca. third millennium BC

river near Kandahar. As with most areas of Afghanistan, this region is arid. The site comprises a

series of mounds. Casal's sequence at Mundigak remains the primary reference point for the Bronze Age in Afghanistan. This sequence has been supplemented by limited excavation of Said Qala-tepe and Deh Morasi Ghundai. The results of excavation clearly indicated seven major occupation periods. From a chronological point of view these represent a time-span of approximately 3,000 years, from the beginning of the fourth to some time in the second millennium B.C. During this time Mundigak developed from a small agricultural village (Periods I-III) to a major urban centre (Periods IV-V), to be abandoned during the Iron Age.

In period II, corresponding to the Early Harappan phase, especially that of Damb Sadaat in the Quetta Valley, the houses, now larger than before, are well constructed and the settlement is notably more compact than in the earlier period. In one house a well with a brick head was discovered

Colonnade of the monumental terrace at Mundigak, Many of the rooms had hearths constructed in the



Left: colonnade of the monumental terrace at Mundigak, NW Afghanistan. Right: carved head excavated near the terrace. Circa 2700 BC. Photos: Jean-Marie Casal.

near Kandhar, Afghanistan, ca. 2700 BC centre. The pottery of this period, by contrast to that of the contemporaneous settlements in Baluchistan, was mainly handmade, and undecorated whatever Urbanization developed rather rapidly: the

most striking example is the rapid development of the Helmand valley. Urbanization was completed between 2600 and 2500 B.C., as is attested by the construction of monumental architectural complexes

at Mundigak in parallel with Shahr-i Sokhta and ur ban centers in the Indus Valley, by the grassroots expansion of the rural architectural villages and by this may signify. On the other hand, this period produced the first crude stone disc seal, and the first of a series of fibacially worked stone leaf-shaped arrowheads (52).

Mundigak III, in which there are six phases of construction, represents a time of great activity, the structures forminga logical development of those of the preceding period. A cemetery was disthe layout of the craftsmen's quarters in the suburban environment. Our knowledge of the Chalcolithic and Bronze Ages in Afghanistan is confined to the excavation of three sites in southern Afghanistan: Mundigak, Said Qala and Deh Morasi Ghundai.

Mundigak is situated in a mountainous region about 55 km north-west of modern Kandahar located in the upper drainage of the Kushk-i Nakhod river, which is roughly parallel to the Arghandab


Group of silver containers from the 3rd - 2nd millenium BC, illegally excavated from a tomb in the Balkh area, northern Afghanistan.

Group of silver containers from the 3rd-2nd millennium BC, excavated from a tomb in the Bash area, northern Afghanistan

Mundigak IV, which is contemporaneous covered at the foot of the mound outside the main bound in a fillet, made of white lime stone, assigned living area, in which there were contracted burials to Mundigak IV.3.This piece has a certain relationgenerally without grave goods in its earlier phase. In ship to the celebrated priest-king of Mohenjo-daro its later phase there were more frequently

commueven if the relationship is not a direct one. nal ossuaries. The bones in these ossuaries had The construction of the above mentioned evidently been exposed, or otherwise excarnated, monumental buildings can be dated between 2500 before deposition. In some cases single pots were and 2300 B.C. and is in the phase of most rapid added as grave goods. The pottery shows an inexpansion of the urban centers and of the most excreasing proportion of wheel-made vessels and an tensive territorial integration corresponding to the exciting range of painted decoration. In particular, latter part of the Early Bronze Age. The buildings black geometric designs on a red surface and polywere constructed on artificially-raised platforms, the chrome designs appear - both having many paralinternal part of which consisted of a close-knit netlels at sites in Baluchistan. The stone-blade industry work of large blocks of masonry that, by relieving continues and there is a considerable inecrease in the counter thrusts, enabled the structure to fit in the use of both copper and bronze. In period III a with the uneven ground morphology of recently acbronze shaft-hole axe and a shaft-hole adze were cumulated soils. The foundation masonry actually found. Terracotta figurine are numerous and include penetrated inside pre-existing buildings, so that the the humped bull and crudely formed human fenew sub-structure cut across the buried walls. The males. There are numbers of flat stone seals, both same type of anchoring system is found at Shahr-i square and circular. Sokhta during the second half of the third millennium B.C.

In terms of relative cultural sequence the construction of these monumental compounds may well have coincided with a new stage in socio-political development. While the first state structures emerged between 3200 and 2800 B.C., and are visible in specialist sectors such as information and administration, a later phase (between 2800 and 2400 B.C.) saw the construction of the actual urban structures themselves in small territorial cells some 500-100 km^2 in area, that is, only slightly larger than the pre-urban concentrations of the fourth millennium B.C. The large public buildings constructed in roughly the same period in larger centers, whether shrines or palaces, were most likely the effect of one or more extensive political projects by some of the ruling elite. The need for a sumptuous ceremonial organization reflects that increased control over the rural resources and production forces which also becomes visible in the contemporary foundations of the craftsmen's quarwith the early periods of Mature Harappan in the ters and the repopula Greater Indus Valley, saw the transformation of the tion of the deltaic plains settlement into a town with massive defensive walls in Sistan and Aracho and square bastions of sun-dried bricks. The main sia.
mound was capped with an extensive building iden The second

tified as a palace, and another smaller mound with
Bronze Age site, Said

apk m a large 'temple' complex. The brick walls of the pal Qala, is located ace had a colonnade of pilasters. The city was de p r o x i m a t e l y 9 6 stroyed and twice rebuilt during the period. An in south-east of Mundigak creasing quantity of pottery was decorated with a near Kandahar city, red slip and black paint, and there was a growing very close to Deh Mo

use of naturalistic decoration showing birds, ibex,
rasi Ghundai. The site

tested by (16); howbulls and *pipal* trees. Female figurines of the 'Zhob was first mother goddess' type are found, and these have Fairservis their closest parallels in Mehrgarh VII, Damb Sa ever, the major excava daat III

and Rana Ghundai IIIC. This suggests that tions were conducted

Mundigak IV corresponds with these periods in its
by J. G. Shaffer some y e a r s l a t e r

Four prehisearlier phase, while in its later phase it is contempo t w e n t y rary with the Mature Harappan period. Further sup(17,18). port for this may be found in the male head with hair toric occupations were



A footed bowl from Mundigak, Southeastern Afghanistan,ca. 1700 BC

identified at Said Qala, all being contemporary with Mundigak III to IV. The initial occupation at the site, Period I, is known only from the lowest 3 m of the deposit. Small rectangular mud-brick house structures, similar to those at Mundigak, were found throughout the first three occupations. Three C^{14} dates for Said Qala are basically contemporary with the end of the third millennium B.C., and all recovered cultural materials indicate that all occupations at Said Qala are essentially equivalent to those of Mundigak Phases III to IV .

The third Bronze Age site is Deh Morasi Ghundai, situated 16 km to the south-west of Said Qala, and about half its size. Deh Morasi is later than Said Qala and represents a Mundigak IV type occupation. The major occupation at Deh Morasi occurred in Period II which is divided into three phases. The only significant architectural feature found in Period II was a small (45 X 28 cm) mudbrick structure, trapezoidal in shape, directly associated with a terracotta female figurine, a copper tube and seal,goat bones and horn, a utilized magnetite nodule and pottery. The entire feature was surrounded by prepared clay floor. L. Dupree interpreted this structure asa 'household shrine'.

Up to now no large sites that could be interpreted as remains of urban settlements have been found in northern Afghanistan. Important changes, however, occurred in this area during the second millennium B.C. At that time, as in other centers of Central Asia, there was a general decline of the proto-urban culture. By contrast, a highly developed culture appeared at the same time in the north; it was studied in detail by the Soviet-Afghan expedition in the 1970s. Dozens of sites belonging to settled agriculturalists and stock-breeders clustering in five or six oases were discovered in a limited space between Daulatabad and Mazar-i Sharif. The sites were situated along the beds of small rivers. They clustered inside the deltaic plains in the areas flanking the desert where the flood-water could be

easily used for irrigation. One may suggest that small canals were used for the same purpose. Tilling was carried out by wooden ploughs; a picture of a bull drawing a carriage was engraved on the surface of a silver vessel. Each oasis possessed a center distinguished from common villages by the presence of a rectangular or square fortress up to 1 ha in size. The fortress was surrounded by mudbrick walls with towers, circular at the corner, and semi-circular along the perimeter (Dashly I, Gardai I).

The prevailing settlement pattern indicates small communities, each one representing an independent social unit, situated at short distances from one another. At the same time, we should note the occurrence of isolated large monumental structures which, beyond any doubt, performed specific functions common to a cluster of sites or even for northern Afghanistan as a whole. Two such structures were excavated at Dashly. A circular fortress was situated in the centre of a square structure, each side of which was 130-150 m long. The occurrence of a shrine inside the fortress with an altar against the wall, validates a suggestion that this was a ceremonial center, probably a temple with numerous services, repositories, granaries, dwellinghouses for priests and auxiliary personnel. The second rectangular structure, 84 x 88 m, features a central courtyard, which contained various repositories and a small house with altar niches. Numerous pilasters decorated the outer walls. It was suggested that this was of a ceremonial temple character but, judging by its planning the residential portion of the hypothetical temple was not present. Probably, it was a temple devoted to a different divinity, as in Mesopota, where temples devoted to a supreme god and to his divine spouse were often situated side by side. At any rate, there is no doubt that we are dealing with a clearly indicated ceremonial and administrative centre of the Bronze Age.

One of the most distant of the Harappan settlements is Shortughai on the southern side of the Amu Darya, near its confluence with the Kokcha River, or near modern-day Kunduz. It is a small settlement, *ca.* 2 ha. in area and is one point in a cluster of several other sites which have not yet been excavated. Shortugai has been excavated for four seasons (1976-1979). Its history can conveniently be divided into two successive phases: A and B. During phase A (*ca*. 2200-2000 BC), the site was a Harappan outpost in Central Asia. During phase B (*ca*. 2000-18000 BC) it was part of the Eastern Bactrian cultural province.

Shortage is a mature Harappan site in this plain and the only Harappan site of this kind outside the limits of the subcontinent. The site, apparently the earliest settlement site of the area, has been related to a network of canal irrigation which was likely to have been introduced in this area only by the Harappans, unless there was a local tradition before them. Canals have been traced by trial trenches and dated by the pottery found in them. They drew their water from the Kokcha by using the local topographical features. It has been assumed that the climate of the time was no different from the present one, and agriculture had to depend on an effective irrigation system then as it has to do now. As an excavated ploughed field covered by flax seeds has been found to date from this period, one has to assume that dry farming also was practiced, especially in areas which could not be covered by irrigation.

Period I of this 2.5 ha site, when only a part of one of its two mounds (Mound A) was occupied, shows a 50 cm thick occupation deposit with a wide range of mature Harappan objects and features, both plain and painted pottery of classic Harappan forms and designs; terracotta cakes, toy-carts, spoons, and figurines; a discoidal mirror of copper and fragments of other copper objects including clay crucibles with copper inside; gold and lead fragments including a discoid gold bead; evidence of

the local processing of lapis lazuli and carnelian; objects of lapis lazuli, agate, turquoise, carnelian, steatite, and sea-shells; an Indus seal depicting a rhino with inscription and inscribed potsherds; and finally, substantial houses made of mud-bricks of the standard Harappan size (1:2:4 ratio). It has been emphasized that 'all the above recorded antiquities of Shortughai exhibit purely Harappan shapes, sizes, proportions and decorations'. Nothing in this range of objects can be attributed to another culture or civilization. Even the excavated plant remains - barley, wheat, panicum millet, lentil, pea, almond, pistachio, grapes, and linseed-have all been familiar from the Harappan sites of the Indus Valley.

Most of the inhabitants at Shortugai lived in domestic structures and were engaged in farming, pastoralism, and craft production, while others did not farm but were full-time craft producers. A monumental building was located in one area of the site. It contained large quantities of shell bracelets and beads, but its function is unknown. Some of the material culture at Shortugai, such as ceramic styles and ornamentation, were produced in the Indus style.

No one is quite sure why there is an Harap

1

pan outpost on the Amu Darya. The French excavation team believes that the site was there primarily to give the Harappans access to the lapis lazuli mines of Sar-i–Sang in Badakhshan. Jim Shaffer has suggested that the Harappans were there to

procure
Bactrian
camels.
Posssehl
thinks

~ r "

" Shortughai was there as a place of generalized trade, and the locus of the "diplomacy" that was needed to promote it between Bactria and Central Asia and the Indus region. In view of the similarities of material culture and its proximity to important natural resources (lapis, gold, silver, copper, and tin), there is a strong possibility that Shortugai was founded by people from the Indus, as an outpost for trade. During the final period at Shortugai, its connections with the Indus diminish. Whatever the reason, and no one really knows the answer to this question, Shortughai has an abundance of Harappan material culture.

Shortugai settlements are strategically located near the world's largest lapis lazuli mine in northeastern Afghanistan and there is some evidence that Shortugai may have been involved in trade with the west, especially in lapis lazuli. The most likely areas which would have traded with Shortugai or similar Harappan outposts are South Turkmenia and NE Iran. During the Namazgah V and Hissar III periods, both these areas were also in contact with the Harappan world, as well as with NE Iran and western Bactria. On the basis of the large quantities of lapis discovered at the site and the lapis mines nearby, a number of archaeologists have assigned these Harappan settlements the role of a lapis procurement and trading outpost in this remote area. They would trace the lsapis lazuli worked at Chanhu-daro to Shortugai. The importance of Shortugai as an Harappan source of lapis lazuli has, however, been disputed in recent years. Opinions now prevail that the ‘lapis lazuli’ found in the

Harappan sites as well as in southeastern Iran is not in fact lapis lazuli. A similar opaque blue stone is commonly found in Chagai area of Baluchistan and most of the stone pieces, which have so far been assumed as lapis, probably came from Chagai.

V.M. Masson

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P b c t 1

FIG.
2. Painted **Painted pottery from Kara-depe (3300-3000 B.C.).**

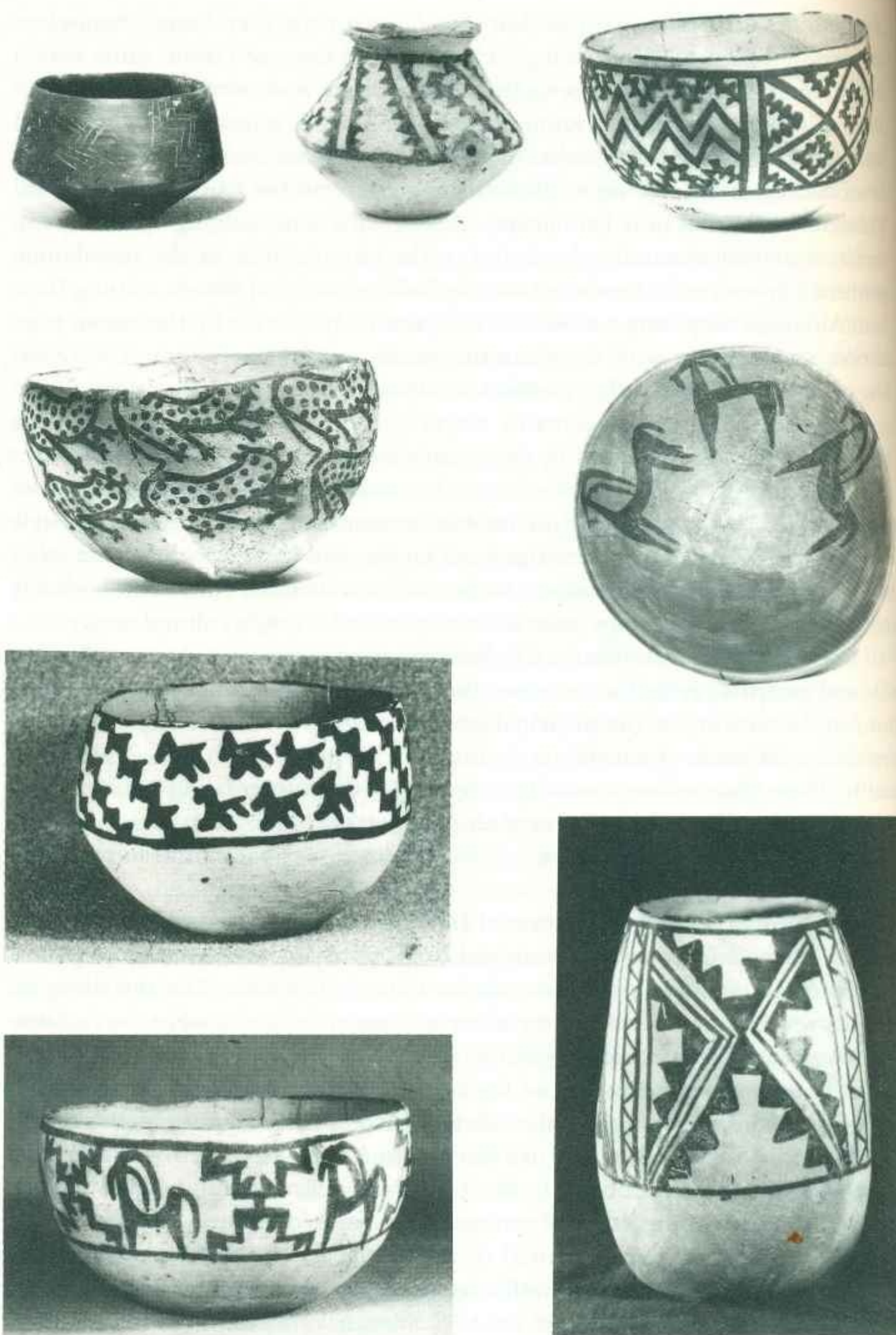


FIG. 2. Painted pottery from Kara-depe (3300–3000 B.C.).

It is inconceivable that a Harappan site at Shortughai existed in isolation; the possibility of other Harappan sites being located in this area is indeed strong, especially in view of the miscellaneous evidence of Harappan contact with the Bactrian area of north Afghanistan, a little to the west of the area where Shortughai is located. Shortughai could not have been reached without crossing the Hindukush, but no positive sign of Harappan contact has yet been obtained from any part of Afghanistan. Obviously, the location of Shortughai is still problematic and nothing can be said about it beyond a general inference that it was probably located where it is useful for the Harappans to get lapis lazuli from Badakhshan and possibly tin and other resources of central Asia. This site also brings to the fore the significance of the Oxus-Indus interaction zone to which we have repeatedly drawn attention in context of the Baluchistan archaeological assemblages and the geography of ancient Pakistan.

Central Asia: Coming to Central Asia, a number of review articles and book-length descriptions are available on the archaeology of southern Turkmenia and northern Afghanistan (10-14) but most of them have been written by archaeologists for archaeologists. This wealth of information has been summarized by Dani and Masson in their edited book on *History of Civilizations in Central Asia* (15). The following account takes advantage of this source and puts the available material in historical perspective. Although almost all of central Asia is our concern here, our interest lies more on southern and southeastern parts, which is southern and eastern Turkmenistan. This is because of the long standing and enduring relationships of this area with the Greater Indus Valley right from the Paleolithic (the Stone Age) or at least from the beginning of agriculture and pastoralism in the region.

Ancient Pakistan has been repeatedly affected by the inflow of migrants and invaders from this area. These people invariably settled in the Pashtun country and Punjab and made the Greater Indus Valley their home. In this respect, it is a matter of great interest as to who these peoples were. The cultural relationship of the Indus Valley with Central Asia is important not only in terms of its antiquity but also of its intensity. Allchins, Fairservis, and more recently Possehl and Ratnagar have put a lot of emphasis on the continuous interaction of the Indus people with those of the region to the northwest and the west of Pakistan, and rightly so. The *Prelude to Civilization*, the Volume II of this series, details this interaction before the onset of urbanization in the Greater Indus Valley.

By and large, the existence of a cultural intercourse between the Indus Valley and the region to its north-west and west is now well understood. What is not commonly realized is the existence of a Bronze Age civilization in this region, generally referred to as Turanic or Oasis Bronze Age Civilization, that flourished more or less in the same time frame as that of the Harappan Civilization. Signs of intimate contact between Central Asia and the Greater Indus region began to appear most vividly in the fourth millennium B.C., when the motifs associated with the wellknown Quetta Ware are found in this region (see *Prelude to Civilization*). This evidence of contact is complemented by figurines of similar styles. Similarities in artifacts and technology, evident in the archaeological record during what is known as the Jeitun phase of south Turkmenian region, directly support this evidence.

It is generally agreed that the developments in Central Asia from the Neolithic to the Bronze Age ran somewhat parallel with those in the Greater Indus Valley. Villages were located along the northeastern piedmont of the Kopet Dag range and the same cultigens (sheep, goat, cattle, wheat, barley) was involved as in Afghanistan and Baluchistan. Like the Indus Valley, southern Tukmenian region lies on

a boundary between mountain and desert, with winter rainfall of about twenty-five centimeters a year.

The geographic scope of the Central Asian Bronze Age Civilization and its interaction with the Indus Civilization is coming to light only slowly. This period of Central Asian cultures has not been properly researched. Whatever work was started after the discovery of Altyn Depe, got interrupted by the World War II. The renewed archaeological work throughout Central Asia, however, did much to clarify the early history of this region and these discoveries have brought an important sense of geographic closure to the northwestern borders of ancient Pakistan. The urbanization of Turkmenia can now be seen as one more example of the socio

Aerial view of Gonor Depe, a key site in the consolation of ancient cities that stretched from northern Afghanistan to southern Turkmenistan, part of the Bacria-Margiana Complex, ca. 1700 BC

-cultural vitality of this region. What has emerged is a complex mosaic of urban centers and regional polities all seemingly linked by an economic dynamism that is both new and impressive. The civilizational splendor may not be as great and overpowering as, for instance, that of the Indus or the Euphrates, but it is an urban phase nevertheless.

! The establishment of new standards in virtually all realms of culture signified the dawning of a new age in the history of the ancient agrarian population of southern Turkmenistan. This was the advent of the Bronze Age period characterized by complexes of the Namazga V, Alton Depe, and Gonur. The traditional dating of this complex in the archaeology of Central Asia is from the end of the

of the


A seal from Central Asia. (the site of Anau). Note the in**A seal from central Asia (the**
scription which is unlike the

site of Anau). Note the inscript of Mesopotamia as well **scription which is unlike the script of Mesopotamia as well as that of the Indus**

third to the first quarter of the second millennium B.C.
The major urban settlement was Altyndepe, with strong fortifications, a ceremonial parade entrance at one gateway, varied techniques of alloying metal, and distinct residential precincts for the elite and

for the populace. Before the beginning of the Bronze Age the two-humped Bactrian camel was domesticated and was put to pulling four-wheeled vehicles and carrying

loads. This is an immensely useful beast of burden in snow-covered regions and arid tracts.

Altyn-depe was situated on high mounds formed by the cultural remains of earlier ages. Its hillsides were faced with mud-brick walls topped by continuous house walls joined in places by additional surrounds. Over certain segments the walls were further reinforced with rectangular tower pylons. The central entry way was designed with parShahr-i-Sokhta/Mundigak/Quettaticular care, the surrounding walls being 6 m thick,

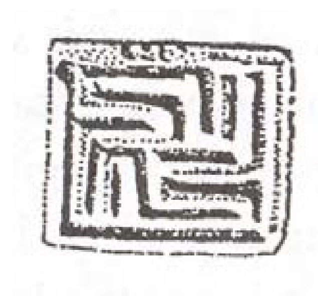
while the entrance gate proper was flanked by two massive rectangular towers.
At Altyn-depe are two finds of particular interest: one is a pair of Indus-style square stamp
During the Harappan period the

seals. These come from different parts of the site but they can both be dated to circa 2500-2200 B.C. These two objects were carved in a "provincial" style, ostensibly at Altyn Depe itself. The swastika seal comes from the so-called Burial Chamber of Priests, where an Harappan-style gold disk bead and four ivory sticks with Indus parallels were also found. There is also a flat copper-bronze blade, without a midrib (an Harappan feature), and a frying pan which was probably connected with the funerary rites of the elite. A large and beautifully etched carnelian bead came from a rich grave, as did a silver amulet in the form of a three-headed feline The blade is a clear Harappan type.

Considerable advances were achieved in building construction, where architectural canons of sorts begin to appear. Judging by the proportions of buildings and gate towers, the basis of the ancient modulus was a 52 X 26 cm rectangular brick, which these structures repeat on increased scales. This most probably represents the same unit of linear measurement, the cubit, that we see throughout the ancient East. There is also a tendency to give shape to the space within a settlement, which is evident in the building of the 'quarter of the nobility' in regular blocks and in the development of monumental structures (the religious complex, the design of the central entryway). At the same time, the device of enlivening walls with evenly spaced and particularly three-step pilasters is directly related to Mesopotamian architecture. Mesopotamian ziggurats must also have suggested the idea of a stepped tower-like structure. The signs scratched on the statuettes bear a clear parallel to proto-Sumerian, and especially to proto-Elamite writing. A number of details characterizing the terracotta figurines, including the large 'all-seeing' eyes, find their analogies in terracotta items from Mesopotamia.

Notwithstanding these observations, not much is known to generalize the town planning and architecture on regional basis. Not enough excavation work has been carried out in the vast agglomerations of dewllings to be able to define the structures of the quarters or even the organization of the street networks. They all share the absence of perimeter walls and fortifications so characteristic of those of the Mesopotamian sand Indus regions. A city gate with a partitioned carriage way has been found at Altyn-depe dating back to the period of greatest expansion, though it is still doubtful whether there were any continuous city walls. The majority of the streets consisted of narrow, winding, unpaved lanes whose level was rapidly raised by accumulated refuse from the houses. The settlement of population was virtually uncontrolled and the residential quarters emerge from the excavations as a somewhat heterogenous system. The impression is that the organization of the urban space was influenced by pre-existing buildings and social relations of the Chalcolithic Age.

Altyn-depe site differs from earlier settlements. Here we find clear evidence of individual districts or quarters of differing functional significance. Thus to the north we find a specialized craftsmen's quarter occupying an area of nearly 2 ha, where we find no fewer than fifty pottery kilns. Here and in other quarters we see a prevalence of multi-chambered houses separated by narrow curving passageways. Distinguishable from such commonplace structures is the 'quarter of the nobility', which is marked by the regularity of its plan and by its spacious, carefully finished houses. An important structural unit was the center of cult worship consisting of a stepped tower-like building 12 m high, spacious storage areas and household structures, as well as a burial ensemble which apparently was the place of interment of members of a priestly commune, and where many valuable objects were



uncovered, including the golden heads of a bull and a wolf, mentioned above.
A characteristic feature of the developed Bronze Age economy was the considerable variety

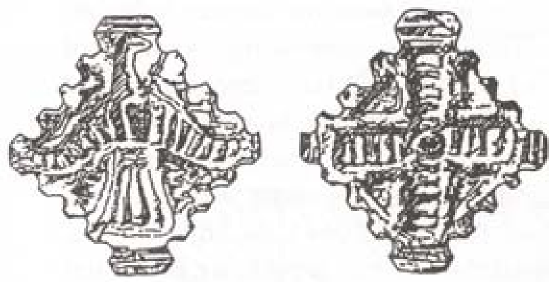
The geographic scope of the Central Asian Bronzeof its crafts. There are grounds for stating that in the
Age Civilization and its interaction with the Indus

major centers of the time the crafts became distinct from agriculture, and that the social division of lahad progressed significantly. Finds include

Civilization is coming to light only slowly. This

bour
maces with sculptured heads in the shape of anLand & Environment!enough workers within the quarter to service sev

period of Central Asian cultures has not been properly researched. Whatever work was started after the discovery of Altyn Depe, got interrupted by the World War II. The renewed archaeological work throughout Central Asia, however, did much





eral dozen such kilns, affords some idea of the marketability of the wares in question. The range of

regions and arid tracts. agricultural crops was augmented by the chick-pea

(Cirer arietinum). Clay models of four-wheeled vehicles show that some of them were probably in

The geographic scope of the Central Asian Bronze

tended to carry heavier loads than before and were

Age Civilization and its interaction with the Indus

There are also fishing hooks from Altyn

Civilization is coming to light only slowly. This

Depe, with eyes to take the line; this is characteris

to clarify the early history of this region and these discoveries have brought an important sense of geographic closure to the northwestern borders of ancient Pakistan. The urbanization of Turkmenia can now be seen as one more example of the socio -cultural vitality of this region. What has emerged is a complex mosaic of urban centers and regional period of Central Asian cultures has not been

other "connection”. Finally, there is a platform with a

properly researched. Whatever work was started

"temple" on its summit at Altyn Depe. There are

after the discovery of Altyn Depe, got interrupted

and the Temple at Mundigak (*ca*. 2700-2300 B.C.).

by the World War II. The renewed archaeological

ence on the Indus Civilization, although most of the

work throughout Central Asia, however, did much

evidence belongs to its later stage. At Harappan

to clarify the early history of this region and these

form of superbly-fashioned animals, plus small

discoveries have brought an important sense of

bronze flagons with long necks (both of which arti

geographic closure to the northwestern borders of

Delhi), that are very Central Asian. A Harappan seal

linked by an economic ancient Pakistan. The urbanization of Turkmenia

ready and this is obviously a link with Central Asia.

dynamism that is both new and impressive. The

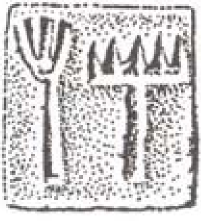
The "eagle seal" from Haraoppa and a comparable
The "eagle seal" from Harappa and a *Possehl*)
comparable example from Gonur in

can now be seen as one more example of the socio

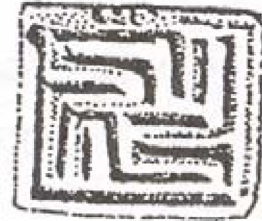
The Harappan influence is also evident in a

example from Gonur in central Asia (-cultural vitality of this region. What has emerged

metal objects from Altyn-depe. Finds even include Central Asia (after Possehl)



is a complex mosaic of urban centers and regional



imported specimens, primarily ivory carvings, in

polities all seemingly

variably occurring in the richer troves or the funer

linked by an economic

ary inventories of wealthier burials. Thus, a treasure

dynamism that is both new and impressive. The civilizational splendor may not be as great and the 'quarter of the nobility' includes divination sticks

made of ivory and flat square chips, used in some

overpowering as, for instance, that of the Indus or the unknown game, fashioned of the same material. Euphrates, but it is an urban phase nevertheless.

Ivory beads formed part of the offerings found in the

now well

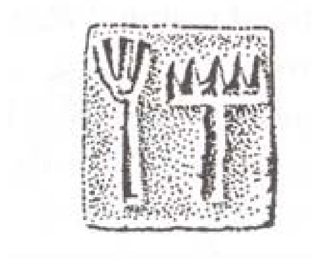
priests' burial-vault. Of particular interest are two **Two Indus type seals from Altyn Depe, one with geo** Harappa-type stamps found at Altyn-depe - one

concerned The interaction of the Indus Valley with Turanic and bearing a swastika, the other two signs of proto Two Indus type seals from Altyn

pictograph but no design.

Harappan Central Asian region during the pre-Harappan period is Depe, one with geometrical designand is

Indus writing.



Excavations at Gonur Depe in Margiana

now well have produced objects that also recall the Indus

produced vessels issuing from professional pottery workshops were now entirely devoid of the painted designs applied by the earlier pottery artists. The sheer productivity of the pottery craft increased considerably. Vessels were fired in two-level kilns which made it possible to achieve uniform temperatures. One pottery kiln 16,000-20,000 vessels at Altyn-depe could fire annually, which, given

animal or animal head. In addition to copper, silver

documented.

and gold, wide use was made of copper-arsenic

We are

with no script and one with an Inprimarily Civilization: a bowl with pipal leaves, a bull's head

here

and copper-lead alloys, that is, of arsenic and lead

however

dus pictograph but no design. of

Tin with occurs much contacts rarely.

concerned of composite design, and Indus-type stick dice. New

the

Harappan

Two Indus type seals from Altyn investigations in the vicinity of another major center bronze. bronze more of the Kopet Dag plain, that of Namazga-depe, haveDepe, one with geometrical design

Civilization with the Central Asian Bronze Age revealed a fairly extensive urban area. It is quitewith no script and one with an In

and implements: finds include daggers, blowpipe probable that these two formations embracing the

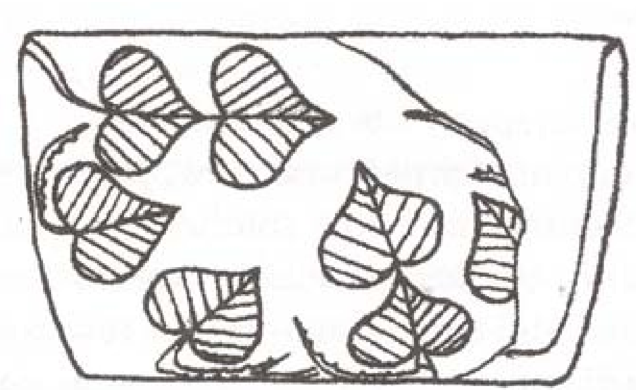
cultures which were partly contemporary. There is Kopet Dag oases, namely Namazga and Altyn, produs pictograph but no design.

objects (rings, bracelets, pins, mirrors and even

some archaeological evidence to that effect and showsvided the context for the emergence of the city-statemassive adzes) were fairly common. which was a feature of antiquity. However, at the
lapis lazuli. A quantity of debris from bead-cutting some similarities between the two cultures. For example, craft products included has been found in the residential areas and one or

of a high-speed potter's wheel, which led to the very far. In any event, neither rich princely burials

standardization of pot shapes. The standard masspottery, stone containers, and beads of several kinds of stone, including turquoise and
two graves at Shahr-i-Sokhta have bead-makers'



lapis lazuli. A quantity of debris from bead-cutting

227

tool-kits interred with the dead. Excavations at
Gonur Depe in Margiana have produced other
has been found in the residential areas and one or two graves at Shahr-i-Sokhta have bead-makers'
tool-kits interred with the dead. Excavations at

nor any building resembling a palace has been uncovered at either site.

All these important changes in the economic basis could not fail to influence the social order: considerable changes did occur in the social and religious sphere. The materials excavated at Altyn-depe show how the prior state of primeval equality came to be supplanted by social differentiation entailing the emergence of social groups with distinct living standards and way of life, probably in accordance with their respective status in the system of production. Thus, the multi-chambered houses in the craftsmen's quarter are similar to the houses of multi-family communes discovered in the Late Chalcolithic settlements.

It appears that a female deity was still worshipped widely. Terracotta female figurines were kept in every house and included in collective burials. But now the statuettes displayed symbolic signs scratched on their thighs and shoulders, whereas the figurines themselves differ from one another in various details of hairstyle, head-dress and adornment. Some archaeologists see in it the forming of a whole female pantheon, with a special deity of the heavens (the star sign), a water deity (the zigzag), a plant deity (the ear-of-corn or branch sign) and certain others. On the other hand, the religious complex at Altyn-depe did not yield a single female statuette. But here the religious objects of the priests' tomb did include a stone plaquette with astral symbols of the moon and stars; moreover, the golden bull's head exhibits a crescent-shaped turquoise inlay on its forehead. All this leads us to suppose that the religious center of Altyn-depe was dedicated to the divine patron of the town, probably a moon god, who in ancient Mesopotamia likewise often appears in the guise of a sacred celestial bull.

Before we conclude, one point must be made. Although there is Harappan material in these regions during and prior to the Indus Bronze Age, there is no evidence at Harappan sites for the presence of Central Asians prior to the culture of Bactria Margiana Archaeological Complex, ca. 2000 BC. Around 2000 BC, the BMAC culture appears in Magriana, as well as in the Greater Indus Region. The decay of the Harappan Civilization and the process of its final demise had already begun. Mohenjo-daro had another hundred years of occupation left, and Harappa probably the same. One might guess that the peoples of the BMAC sensed a vacuum in the Indus Valley region and moved in to fill it. The evidence comes from the presence of BMAC artifacts in the upper levels of Mohenjodaro and Chanhu-daro, which date to *ca.* 2000 B.C. It is also indicated by the presence of MBAC in the Quetta Valley, and at Sibri, and Mehi. We should recall that the BMAC emerges in Early Namazga VI times (*ca.* 2000 B.C.) and endures for about 250 years, until *ca.* 1750 B.C. This is a time during which the Indus Civilization had already wilting and was in the process of decay and decline.

Mesopotamia - A Distant Land but Closer at Hand: During the Harappan period the interactions of the Indus people with those of Iran and Central Asia were broadened by the addition of the trade relationships with the people living around the Persian Gulf and these contacts extended up to south Mesopotamia. Shortly after 2400 BC direct traffic in luxury as well as utility goods was activated between lower Mesopotamia and the Indus Civilization, along a maritime route of communication that ran along the Makran coast. These contacts were most likely indirect, through a relay system involving the people of *Magan* and *Dilmun*, that is, the people living around the Persian Gulf. This appears to have been founded on a knowledge of the surroundings and the technological advances in maritime activities in the Arabian Sea.

The Harappans did not have maps, but we can produce fairly reliable ones based on site locations

known from archaeological excavations and surveys and polities named in Mesopotamian texts. For example, figure below by Rita Wright (19) includes some of the major sites that have been subject to archaeological exploration. The same figure includes the names of places mentioned in Mesopotamian texts. As Timothy Potts notes (20), it is unclear whether textural references are to countries, cities, or towns or whether they are for ‘regions of varying size and definition, for trivial and other ethnically-based territories, as well as for national states’. The location of the various names are not clear but there is a general agreement on the location of Meluhha, Magan and Dilmun; Meluhha being the Indus Valley, Magan being the Makran coast and the northern tip of Oman, and Dilmun being the southern coat of the Persian Gulf.

Widely considered to be the cradle of civilization, Bronze Age Mesopotamia included Sumer and the Akkadian, Babylonian and Assyrian empires. In the Iron Age, it was controlled by the NeoAssyrian and Neo-Babylonian. The indigenous Sumerians and Akkadians (including Assyrians and Babylonians) dominated Mesopotamia from the beginning of written history (*ca.* 3100 BC) to the fall of Babylon in 539 BC, when it was conquered by the Achaemenid Empire. It fell to Alexander the Great in 332 BC and after his death it became part of the Greek Seleucid Empire.

Mesopotamia encompasses the land between the Euphrates and Tigris rivers, both of which have their headwaters in the mountains of Armenia in modern-day Turkey. Both rivers are fed by numerous tributaries, and the entire river system drains a vast mountainous region. Overland routes in Mesopotamia usually follow the Euphrates because the banks of the Tigris are frequently steep and difficult. The climate of the region is semi-arid, just like the Indus Valley, with a vast desert expanse in the north which gives way to a 15,000 square kilometers (5,800 sq. mi) region of marshes, lagoons, mud flats, and reed banks in the south. In

the extreme south, the Euphrates and the Tigris unite and empty into the Persian Gulf.

The arid environment which ranges from the northern areas of rain-fed agriculture to the south where irrigation of agriculture is essential for sustaing any level of human population. This irrigation is aided by a high water table and by melting snows from the high peaks of the Zagreb Mountains. The usefulness of irrigation depends upon the ability to mobilize sufficient labor for the construction and maintenance of canals, and this, from the earliest period, has assisted the development of urban settlements and centralized systems of political authority.

Agriculture throughout the region has been supplemented by nomadic pastoralism, where tentdwelling nomads herded sheep and goats (and later camels) from the river pastures in the dry summer months, out into seasonal grazing lands on the desert fringe in the wet winter season.The area is generally lacking in building stone, precious metals and timber, and so historically has relied upon long distance trade of agricultural products to secure these items from outlying areas. In the marshlands to the south of the area, a complex water-borne fishing culture has existed since prehistoric times, and has added to the cultural mix.

As noted in earlier, sustained agricultural settlement arose globally around 6000 BC in broad flat river valleys where large scale irrigation projects were possible or where annual inundation favored growing of food crops. The inhabitants of Mesopotamia, for example, learned to conserve flood waters by opening networks of canals between the Tigris and Euphrates Rivers. The vestiges of these vast canal networks are today visible in aerial and satellite photography, while the people of the Indus plains relied more on predictable floods in the Indus and its various tributaries.

The land between the rivers presented itself as a hot, dry, flat, seemingly barren stretch of desert. Through irrigation the earth furnished abundant food supplies. The inhabitants of Mesopotamia produced abundant surpluses of food, principally grain, but a host of garden crops as well, to sustain an estimated population of 1-2 million people by Roman times. Additional surpluses were exchanged for resources unavailable locally. With temperatures attaining 140° F. during the summer months, the climate can best be described as daunting. Shade furnished by date palm trees, lush canal-fed gardens and domestic quarters, not to mention abundant food and water, made it bearable.

Archaeological investigation indicates that the process of urbanization in Mesopotamia began as early as 5800 BC, with several large centers of population arising in southern Mesopotamia by 4300 BC. Village sized Ubaid culture (5800-4000 BC) first took hold where the lower arms of the Tigris and Euphrates Rivers reached the Persian Gulf. Geological evidence indicates that the sea level ceased to rise around 5000 BC, causing the mouths of the rivers to silt in. This impeded natural drainage and formed a large area of inland lagoons and marshes. As the climate became drier, communities adapted to small scale irrigated farming in areas where water tables were already high. Crop yields soon rose dramatically. Mesopotamian texts dated to 2100 BC record yield to seed ratios of 30:1 and even 50:1. With the advent of bronze tools around 3500 BC, the labor intensive aspects of irrigation work became manageable, stimulating the rise of large urban settlements. By 3200 BC the city of Uruk sustained an estimated population of 50000 living behind massive city walls.

Even a cursory look at the history of Mesopotamia would make two points immediately evident. The general tendency toward consolidation of power into imperial dynasties in Mesopotamia was repeatedly offset by countervailing forces of sudden political collapse and invasions by unassimilated migrating peoples. The ebb and flow of these phenomena prohibited the rise of a sustained era of stability comparable to that of Old Kingdom Egypt. In time, newly arrived elements assimilated the prevailing Sumero-Akkadian culture even as they furnished it with fresh ideas and technologies. With each resurgence of empire -- Sargon of Akkad, the Third Dynasty of Ur, Hammurabi of Babylon -- the number of cities that dotted the plain of Mesopotamia increased. The prevailing mood of Mesopotamian chroniclers remained pessimistic, nonetheless

The structure of Mesopotamian urban societies, and regional empires, needs also to be addressed here as it is important in the context of comparison with the Indus Civilization. By the time of the earliest Mesopotamian empire (2700 BC), the character of political institutions was essentially formed. The earliest Sumerian communities emerged under the aegis of religious authorities who most probably furnished sanctuary to people fleeing various dangers. Priestly authorities claimed the ability to mediate with divine entities, thereby obtaining religious sanction for human endeavors such as farming and related matters such as favorable weather and the avoidance of floods and earthquakes. Priests also claimed to possess the power to channel harmful supernatural energy toward their adversaries. In short, the earliest Mesopotamian societies appear to have been ruled by priests called *enlils*. Each Sumerian community, and nearly every ancient community for that matter, perceived itself as obtaining supernatural protection from a particular patron deity. To a large degree the relationship between patron deity and chief priest or priestess was viewed in sexual terms, with male priests presiding over cities protected by female deities and vice versa.

No sooner had stratified societies emerged in Mesopotamia, however, than political power began to shift elsewhere, particularly as inhabitants came to acquire independent assets. Vague authorities referred to as *enlils* began to slip, and military warlords named *lugals* began to emerge. Perhaps

recruited originally by priestly authorities to address the threat of border wars with neighboring communities, *lugals* quickly exploited their military power to seize control of their respective communities. Establishing themselves as formally sanctioned monarchs, l*ugals* drew on popular support within their cities to supplant rival religious authorities with more pliant representatives. Both the Gilgamesh epic, which clearly existed in written form by 2600 BC and Hammurabi's law code, written nearly a millennium later, offer the same tripartite organization of political organization in Mesopotamian cities.

The main architectural feature of early Mesopotamian cities was the temple and this structure has long been considered the primary institution of a theocratically organized political economy. The palaces were a later development that emerged when competitive warfare among the city-states for the control of land and trade routes became more frequent. Congruent with this is the evidence that shows an implosion of population from surrounding towns and villages to live within the protected confines of walled cities. Thus was the early “peer polity” or “early state module” of coevolving archaic states transformed into an intercitystate system of warring and allying states.

This transition from theocracy to the primacy of a warrior king was an important development in the emergence of state-based modes of accumulation. The Sumerian cities erected their states – specialized institutions of regional control – over the tops of kin-based normative institutions. Assemblies of lineage heads long continued to play an important role in the politics of Mesopotamia. But the structures of institutional coercion became ever more important for maintaining power and accumulating wealth. The temple economy required contributions of goods and labor time, including animal sacrifices that were consumed in religious feasts.The emerging cities of Mesopotamia founded colonies and colonial enclaves within existing towns across a vast region in order to gain access to desired goods and to control trade routes. There is some disagreement as to the degree of direct control that these core city-states were able to exercise over distant peripheral regions.

The question of Mesopotamia-Indus relations has long been a topic of much debate. The publication of Oppenheim's *Seafaring Merchants of Ur* in 1954, reviewing tablets from Ur, did much to bring a focus on the Persian Gulf and third millennium maritime activities between *Dilmun, Magan,* and *Meluhha*. The “Dilmun trade”, as it has come to be called, is thought to be an extraordinary important element in sustaining the Indus Civilization, if not in its formation. This aspect of the Harappan Civilization forms a separate chapter of this book.

In dealing with the people of Mesopotamia, the people of the Indus Valley were dealing with a true and well-developed Bronze Age civilization. But, this civilization, although contemporary, drastically differed in character, technological level, and the general value system from their own. While the Mesopotamian people were organized around their temples, the *zigurats,* the Indus people organized their communities with common economic interests and mutual inter-dependence; while the Mesopotamians spent their surplus on the glorification of their city gods, the Harappans spent it on building public facilities such as paved streets, wells, drainage system, etc.; while the universe of the Mesopotamians was their city, the Harappans interacted with their own kind over a large and diversified area; while the artistic and engineering efforts of the Mesopotamians were expended on the beautification of their temples, the Harappans expended these efforts on the construction of public and private buildings of utilitarian nature; and while the Mesopotamians rarely ventured outside their homeland for the purpose of colonizing other lands and for finding markets for their goods, the Harappans were known to be accomplished seafarers, to the extent that their 5000 years old name, the

Meluhha, became the name of the sailor itself, the *Mallah*, half the world over.

Mesopotamians built large temples, the *zigurats,* to their city gods and located them in the middle of the city. The two civilizations could not be more different but they were complementary. Although the peoples benefited from each other in material goods, they had nothing in common to offer each other for the sake of affecting their respective ways of living. The result is that we do not see any Sumerian or Akkadian influence on the Indus Civilization, nor any cultural or technological influence of the Indus culture on the Mesopotamian society. Thus, these interactions, as deep as they apparently were, cannot be put at the same level as those between the Indus Valley, Iran, Turan, and Central Asia.

The area of the Persian Gulf and Mesopotamia is not a contiguous region with the Indus Valley, even not with the Iranian Plateau. All the interaction between the Harappans and the peoples of the Gulf was through the sea and generally through the imperatives of trade. This maritime trade has been important for the Bronze Age civilization of Mesopotamia as well as that of the Indus Valley. This topic has recently been researched quite extensively and we devote to it an entire chapter (the chapter on Maritime Trade) in this book.

THE LANDS TO THE EAST

On the east, we are dealing with two interaction zones: one is the region of the Indo-Gangetic Divide and beyond in the Northeast and the other across the marshes and salt deserts of Kutch in Saurashtra and Gujarat. Besides these, we have a large array of hunter-gatherers and marginally pastoral-agricultural communities all along the current Indo-Pakistan borders that may not have any meaningful contacts with the Hardpans but may still have provided some needed raw materials to the Harappans. The evidence for such a contact is, however, not at hand and it is doubtful that a fullblown urban society, such as the Harappan Civilization, could have anything common with such preNeolithic societies, such as those existing in India at the time.

Indo-Gangetic Divide and the Gangetic Plains: The northern Plains of India and that of the Indus are habitually grouped together by archaeologists as the “Indo-Gangetic Plain”. This is an erroneous identification. Despite the physical homogeneity appearing on the map, real differentiations exist between the plains that are drained by the Indus and its tributaries and that which are drained by Jamuna, Ganga, Brahmaputra, and their tributaries. The former group drains to the west while the latter group flows to the east. They are different not only in terms of the drainage, but also in soil, geology and natural relief and other physical constraints as a whole. In fact, the influence of drainage in creating physical differences has been overwhelming. The insignificant Ghaggar becomes a major natural factor in differentiation of the region from the area lying on its either side up to the point where the river itself gets lost in the thirsty sands of Cholistan in Pakistan. Landforms is the first factor to be taken into consideration, but climate cannot be ignored. This is why some geographers divide these northern plains into three distinct regions:
1. The Indus Plains (the Indus Valley)
2. The Ganga-Jamuna plains (the Northern Indian

plains, Gangetic plains)
3. The Indo-Gangetic Divide (Punjab-Haryana
plains, the area around the Ghaggar)
The Gangetic plain is bound on the north by the abruptly rising Himalayas which feed its numerous rivers and are the source of the fertile alluvium deposited across the region by three river systems:

Jamuna, Ganga, and Brahmaputra.The southern edge of the plain is marked by the Vindhya Range, and the Chota Nagpur Plateau. The Indus plains, on the other hand, are defined by the Indus river and its various tributaries, including Beas and Sutlej (both are now in the present-day India.). On the west rises the Iranian Plateau and in the south is the Arabian Sea.

In the middle of these two systems lies the Divide, a small area between the two main drainage systems. On one side is the water drainage system of the Indus and on the other side is that of Ganga-Jamuna system. The region is transitional in nature between the hilly Siwaliks and the drainage plains below. This divide is only 300 meters above sea level and only 60 km at its widest expanse but still a contiguous territory, causing the perception of the Indo-Gangetic plains as a continuation of the Indus plains towards the East or that of the Gangetic plains towards the west.

Geographically speaking, the Indo-Gangetic divide of Punjab, Haryana and Northern Rajasthan is an eastern extension of the Indus plains, forming the apex of the Indus triangle. The natural barriers

Civilization, nor any cultural or technological influence of the Indus culture on the Ancient Pakistan - An Archaeological HistoryMesopotamian society. Thus, these interactions, as deep as they apparently were, cannot be put at the same level as those between the Indus Valley, Iran, Turan, and Central

the Thar, historically channeled the movement of

Asia.people and beasts towards the rich plains of Hary

ana before entering the Ganges Valleys or the highlands of Central India. The route running along the

The area of the Persian Gulf and Mesopotamia is not a contiguous region with the Indus

them here from the northwest of Pakistan or from

Valley, even not with the Iranian Plateau. All the interaction between the Harappans and

along the Gaghar-Hakra river system. Panipat

the peoples of the Gulf was through the sea and generally through the imperatives of

eral historic battles have been fought between the

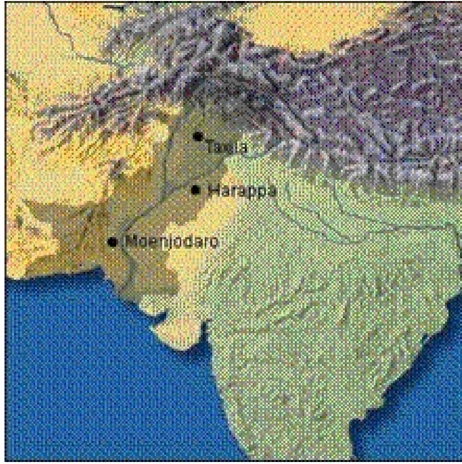
trade. This maritime trade has been important for the Bronze Age civilization of

defenders of the east (the Gangetic plains). Once

Mesopotamia as well as that of the Indus Valley. This topic has recently been

the vast territory of northern India (Hindustan).

researched quite extensively and we devote to it an entire chapter in this book.

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Interaction zones in the East `

Hinterland of the East: India, there constituted the upper Gangetic plains east of the Sutlej River, and the other across the marshes and salt deserts of Kutch. Contrary to what some Indian archaeologists and popular writers claim, there is little archaeological evidence to an interaction of the Indus people with these cultural zones up to the end of 2nd millennium BC. However, these interactions became quite significant in the post-Harappan times, beginning with a hesitant start in late Harappan period. The relationships of the Indus people with the peoples of the East must be put in

Indus and those of the Ganges-Yamuna, namely,

perspective. Compared to the interaction with the west, the relations of the Indus Valley

India, is exceedingly strategic point between the

with the East were neither extensive nor expansive. The archaeological evidence shows

of compulsive interaction; a corridor for transmitting

that whatever interaction the Indus people might have had with the peoples of the East,

the east in the early history of the subcontinent;

it was the result of the former’s expansion activities along the borders of the Indus

thoughts to the west in the beginning of the present

Valley rather than the interaction between cultures. A second point to remember is that

flow of two-way traffic in men, materials and ideas

these borderline areas which the Indus people penetrated were either sparsely populated

In 1947 partition left India without a single

or not populated at all. In the Harappan settlements of these areas, we do not see the

past half a century Indian archaeologists have con

presence of any other material effects alongside the Indus artifacts, indicating the

to light large numbers of “Harappan” sites in north

general absence of other peoples in the neighborhood. This was probably the reason that

extension of our knowledge, due mainly to the ex

all the cultural and technological developments that were taking place in the Indus
Valley and to its west in the Turanic and Central Asian region left the eastern borderlands virtually untouched. Geography, i.e. the presence of the Thar desert, the
thick jungle and marshlands at the northern tip of the Thar, the vast spans of salt deserts

Survey of India. Unfortunately, the division of scholarship between the modern borders of Pakistan and India has inhibited the coordination of research projects so that there currently is no clear synthesis concerning the relationship of patterns identified on either side of the borders. In the absence of any international cooperation, we do not even know what are the criteria to qualify a site to be called 'Harappan" and whether a site listed as "Harappan" is indeed Harappan.

In the North the Divide, principal sites are at Ropar in the Indian Punjab and Kalibangan in north Rajasthan. In addition, a large number of other "Harappan" sites have been located and some of them have been excavated, e.g. Banawali and Rakhi Garhi, described in one of the preceding chapters. The "Indus" character of most of the other settlements is, however, not confirmed or, at least, not reported properly. The general picture of the preHarappan cultures is that of a hunters-gatherers society with some pockets of elementary agriculture and settled life. Possehl (3) and some Indian ar



Terracotta toy wheels from Bernoulli in the Indo-Gangetic Divide

chaeologists take pain in describing these sites as belonging to some unique pre-Urban cultural phase similar to that of the Early Harappan and call it Sothi-Siswal phase. But Mughal, after a critical examination of the artifacts excavated at these sites, came to the conclusion that none of these sites belonged to any distinct cultural phase of the region. These settlements left behind some characteristic pottery, querns (large and reasonably flat, coarsegrained stones for grinding grain), deep clay-lined bins for storage and multiple bangles) as their legacy but most of the other artifacts are nothing more than a local reflection of the Kot Diji culture of the Greater Indus Valley in Cholistan.

Resemblances between the Kot Diji ceramics in Cholistan and the Sothi-Sisal materials are not surprising given the contiguous nature of the two regions. Interestingly, there are occasional pottery links to northern Baluchistan, as was the case in Cholistan, Harappa, and some of the Beas settlements. These data complement the evidence for technologies (for example, faience) known at other contemporary settlements and non-local raw materials, such as copper, gold, steatite, marine shells, and lapis lazuli that are suggestive of some interaction among Pre-urban settlements in the Indus Valley. Although Sothi and Siswal are two sites on which these ceramics were discovered, Kalibangan and Banawali are the best documented sites during the Pre-urban period of settlement in the Ghaggar region. The materials at Banawali and Kalibangan are "identical in respect of ceramics, architecture and antiquities".

In most of the post-Independence excavation reports, which are not very many, a lack of precision and clear identification of archaeological markers is lamentable. It appears that any site with a single sherd of Harappan pottery would qualify for a “Harappan” site. Because of this loose definition and some irresponsible claims, it is no wonder that Indian Punjab, Haryana, and Rajasthan became infested with hundreds of “Harappan” sites. While the nature of most of these ‘Indus’ or ‘Harappan’ sites is questionable, there are some sites that are indeed Harappan by any measures. Still, how many of the ‘recently discovered’ sites are the Early Indus (Kot Dijian), how many are Harappans and how many are post-Harappans, we do not know.

Whether the Divide was an integral part of the Harappan culture, whether the Harappan had an interest in this area for exploiting the needed raw material, or whether it was a classical interaction zone, is being debated vigorously. Indian archaeologists tend to favor the first option but archaeologists like Mughal consider this area as a mere shadow of the Kot-Diji culture with some influence of the Harappan urbanization in later years. Mughal does not see any of the pre-Urban sites in this area mature to a true Harappan site, indicating it to be periphery rather than an part of the civilizational core.

Gujarat (Kutch and Kathiawar): The second interaction zone or the zone of expansion is Kutch and Saurashtra in Gujarat. Physiographically, Gujarat constitutes three distinct zones: Kutch, the Saurashtra peninsula or Kathiawar, and mainland Gujarat. Kutch is a vast desert-like expanse of mixed soils dotted with low hills which break the monotony of the landscape. Kutch is bordered by desolate salt flats known as Ranns. The Ranns of Kutch were originally shallow bays connected to the sea. These bays have been gradually filled with silt and sand carried down from the western Nara of Sindh. The peninsula of Saurashtra (Kathiawar) forms a rocky tableland fringed by coastal plains. A major portion of Saurashtra is occupied by Deccan lava flows. The central part is made up of an undulating plain broken by hills and considerably dissected by various rivers flowing in all directions. Saurashtra has vast tracts of rich black cotton soil derived from weathered basalt, known for its moisture retaining capacities. The rest of Gujarat is a semiarid, sandy plain, dotted with fossil sand dunes and attended blowouts. Gujarat lies in the transitional zone between the monsoon climate in the south and the arid region of Rajasthan in the north or the dry zone of Sindh. The subsistence crops of Gujarat are dominated by millets *bajra* and *jowar*. Wheat is also produced but its production is restricted to irrigated acrage.

Until recently it was assumed that the earliest settled agricultural communities in Gujarat were est settled agricultural communities in Gujarat were 2000 BC). Recent excavations carried out at Loteshwar in northern Gujarat, Padri in Saurashtra and Dholavira in Kutch, and the reanalysis of

older archaeological data from Prabhas Patna, Lothal and Surkotada, has suggested that prior to the coming of the Harappans Gujarat was already inhabited by regional non-Harappan agricultural communities. Calibrated radiocarbon dates for this cultural phase from Loteshwar, Padri and Prabha Patna go back to the second half of the fourth millennium BC, making them more than half a millennium earlier than any Harappan immigrants. In this regard it is worth noting that Kutch, northern Gujarat and Saurashtra have revealed sites of a pre-urban phase with regional Chalcolithic traditions involving nonHarappan pottery types. Critical reviews of this phase of Gujarat are available in Sonawane and Ajithprasad (22) and Bhan (23).

Equally important evidence regarding the development of agricultural settlements in northern Gujarat has been brought forth from Niagara and Santali. The pottery found here with the extended inhumations and in symbolic pot burials shows some similarities with the vessel forms recovered from the very early levels at Kot Diji, Amri and Balakot. Analogous pottery types have been reported from secondary fractional and pot burials in the cemetery at Surkotada. These too are comparable with pre-Harappan burials in Sindh and Baluchistan. All this goes to show that the Indus technology and some aspects of the Early Harappan culture were already diffusing from Sindh, and this area was not ‘foreign’ to the Indus people before the establishment of the Harappan settlements in the region.

Impressive evidence of an Early Harappan occupation has been brought to light from the excavations at Dholavira. A 60-70 cm thick deposit at the bottom of the total 12 m habitation sequence belongs to an Early Harappan. Most pottery of this early phase is a wheel made red ware of light or pinkish tones treated with a variety of slips, or decorated with incised horizontal grooves. From the archaeological data it is also apparent that there is considerable cultural diversity in the early levels. But apart from pottery and a few other material remains, very little is known about the origins and development of these early village farming communities. It is clear, nevertheless, that elements of the Early Indus culture of Sindh and Baluchistan extended southwards as far as north Gujarat at a time when this region was already inhabited by indigenous Neolithic and in some case Chalcolithic communities, interspersed by diverse groups of huntergatherers communities.

In context with the Mature Harappan Civilization, two distinct categories of settlement can be identified in Gujarat: (1) sites with classical Harappan traits, and (2) sites with regional manifestations of the Harappan, proposed by Possehl to belong to the Sindhi and Sorath Harappan domains, respectively. Here it is important to note that in more than five hundred sites in Gujarat with different degrees of Harappan and non-Harappan affliations, settlements representing the Mature Harappan phase are few and far between. Out of 25 settlements in this category, 15 are situated in Kutch and the rest are sparsely distributed in other parts of the region. Locationwise, these sites can be broadly categorized as coastal settlements, situated either on the sea coast or on the margins of the Ranns: Lothal in northern Gujarat and Dholavira in Kutch both fall in this category.

Other settlements that may have held strategic positions in distribution networks lie to the east beyond Dholavira. Of special interest is the small village of Lothal (less than five hectares) near the head of the Gulf of Cambay. A massive brick wall surrounds the site, which was built in identifiable districts. These districts included an upper town constructed on a large platform raised above the settlement and a lower town. Mud and baked brick structures were found along the streets of its upper town. One building had a large mudbrick foundation that was similar to the "granary" at Mohenjo-daro. Like Mohenjo-daro, very little was left behind with which to substantiate its function as a granary.

Streets in Lothal's lower town were oriented to the cardinal directions and contained residential structures. The houses were constructed around courtyards and had bathing areas paved with baked brick that were hooked up to a system of drains. Lined up on streets and lanes, workshops were interspersed in neighborhoods. A third feature, and the most controversial sector of the town, is a "dockyard" (see Chapter 9), consisting of a depressed rectangular space enclosed by a baked brick wall. Based on the presence of post holes, anchor stones possibly for tying ships, Rao believes the area was connected to tidal flows from the sea and the depressed space was used for docking. Although Rao's interpretation has been criticized, scholars have not offered feasible alternative explanations, though one possibility is that it was a tank for collecting water as Bisht has suggested at Dholavira.

Other settlements are relatively small, certainly not urban in scale and to some degree spatially isolated from the heartland of the civilization. Some general principles of city planning noted for Indus cities appear to have been shared, although there were local variations in planning and material culture. These similarities and variations suggest a high degree of interaction among the major settlements as well as the local autonomy.

There is no abrupt end to the Harappan phase in Kutch and Suarashtra and a continuity into post-Urban phase is recognized in almost all Harappan-influenced settlements. This continuity is, in fact, much more evident in Gujarat than in the core area of the Harappan Civilization. Indus culture seems to linger on for considerable time after its vestiges in Punjab and Sindh have almost completely vanished. Because of this feature, the Harappan settlements have archaeologically acquired a status of more popst-Harappan settlements than the Mature Harappan.

Among the distinctive features of the postUrban Harappan settlements in Gujarat, the first and foremost is the general economic decline in material culture and a gradual process of deurbanization. Some settlements show this trend earlier than the others but in general the beginning of the process is post-Harappan. A deterioration in material culture in Lothal is exlicit. The acropolis, “warehouse” and “dockyard” were abandoned. Even house floors were now paved with brickbats collected from earlier constructions. The settlement of Dholavira, which also had some semblance of urban culture, shrank to a small village.

Hunter-Gatherers of the East: Apart from the small area in the north, identified as the Divide, and somewhat larger area in the South, identified as Kutch and Saurashtra, in the eastern front of Pakistan we are mostly dealing with cultures that are basically late Paleolithic in character or based on a pastoral nomadic or very elementary agricultural economies. Some of these cultures were definitely ceramic and some of them probably knew the use of copper tools. The Indus people interacted with these societies only peripherally and perhaps only indirectly. The geography was the major impediments and the cultural gap was another. Still, we see some, although only marginal, cultural contacts of the Indus people with the peoples of this region. Looking at the archaeological data, it is evident that between the fourth and second millennium BC there existed a mosaic of different adaptations such as hunting and gathering, pastoralism, elementary agriculture, and various specialized craft production strategies.

This region was occupied by a culture named after two of its settlements: Jodhpura and Ganeshwar. The people of the Jodhpur-Ganeshwar culture were in the main hunters, gatherers, and fishers, but they also exploited local copper ore. Other metal ores available in the Aravallis and the adjacent

Tosham region included lead, zinc, and tin, and it is possible that the tin was also exploited, although there is no archaeological evidence of this. Evidence of copper mining and smelting in this region goes back to as far as the late fourth millennium, and by the Early Harappan period the Jodhpur-Ganeshwar people were manufacturing large quantities of small copper objects, which they may have traded with neighboring groups.

The Ahar-Banas was another culture group that continued in the area to the southwest of the Jodhpur-Ganeshwar culture, with whom they were in communication. Limited, and possibly indirect, contact with the Harappans is shown by the presence at Ahar of six Indus beads, one of lapis lazuli and five of carnelian. The Ahar-Banas people lived in settlements, such as Ahar, Balathal, and Gilund, made up of substantial rectangular houses of stone, wattle and daub, and mud brick, with flat thatched or earth-covered roofs; at Balathal, stone was quarried locally to build house foundations. Larger houses were divided into several rooms and often there was a kitchen area with a built hearth *(chulah)* and a saddle quern. The Ahar-Banas people practiced limited farming, growing millets, wheat, barley, and pulses; raising cattle and other animals; and exploiting local wild resources such as deer, peafowl, fish, and snails. The importance of cattle is reflected in their production of cattle figurines. However, by an large they were primarily huntergatherers, largely nomadic or living in small settlements.

Some farming settlements appeared during the later third millennium farther to the south, in Madhya Pradesh, east of Gujarat and north of the Narmada River. These belonged to the Kayatha culture, best-known from the settlement at Kayatha. People here made microliths and blades of chalcedony and also used copper axes, bangles, and other objects, either locally made or obtained from the Jodhpur-Ganeshwar culture. They made various styles of plain and painted pottery, possibly inspired by Harappan pottery. Caches of carnelian, agate, and steatite beads probably reflect contacts with the Harappans in Gujarat to the west, perhaps related to the exploitation of local carnelian and agate sources. After 2100 BC, some of the pottery styles present there, such as white-painted Black-and-Red ware, indicate contacts with the Ahar-Banas culture. Terracotta figurines of bulls are also known at Kayatha from this period.

Recently discovered evidence from Karnataka in South India indicates that there were settled communities in this region by the early third millennium, occupying cleared and leveled sites on granite hills, where they constructed round huts of timber posts, wattle, and daub. They also constructed large wooden stockades (ash mounds) on open ground, where they penned locally domesticated cattle, periodically setting fire to the pens to destroy the dung, perhaps to prevent disease. The central importance of cattle is reflected in the large numbers of terra-cotta figurines of cattle and the depictions of cattle in the rock art of the region. These people began to cultivate local food plants, including several varieties of millet and pulse, as well as growing or gathering tubers; through time, the latter declined in importance in favor of millets. They made poorly fired gray pottery and stone tools, including many ground stone axes. Some of the settlements were in the important gold-bearing regions, suggesting that local gold may have been utilized at this time.

About 400 Mesolithic sites have been reported from Gujarat. These people, who made and used microlithic tools, were hunters and gatherers and they populated these areas prior to the domestication of plants and animals. Important evidence from the sites of Loteshwar and other sites indicates that some of these people managed herds of sheep and/or goats, and perhaps cattle, which complimented and added to the food resources they obtained by hunting and gathering. This is in conformity with the parallel evidence obtained from other northwest Indian mesolithic sites such as

Bagor. Even after the emergence of the earliest farming and stock raising Chalcolithic communities in the fourth millennium BC, microlith-using communities continued to live in Gujarat in symbiotic relationship with the settled agriculturists.

Bagor in Rajathan had been occupied for several millennia by hunter-gatherers who also herded domestic sheep, goats, and cattle. After 2800 BC they began making pottery, which had some similarities to the ceramics of their neighbors, the Ahar-Banas and Kayatha cultures, though the Bagor pots were of much poorer quality. Two arrowheads, a ribbed spearhead, and an awl, all of copper, and a necklace of beads, including some of banded agate and carnelian, are known from a burial of this period. The arrowheads were probably made by the Jodhpura-Ganeshwar culture but may have reached the inhabitants of Bagor through trade with the Harappans in Gujarat, perhaps along with the beads, in exchange for the kind of goods to which hunter-gatherers had access, such as game and ivory. Similar evidence comes from Langnaj, a hunter-gatherer settlement in northern Gujarat, where a copper knife and dentalium beads suggest contacts with the Harappans.

We do not know much about the continental India during the Indus Age but it appears that village life was established in *some* parts of peninsular India in late third millennium BC. There was a widely distributed Neolithic culture through northern Karnataka, with an economy based on cattlerearing, hunting, gathering, and cultivation of millets and chickpeas. Some of the sites (Maski, Piklihal) are located in the close vicinity of a rich gold deposit, Hutti, in the Raichur doab, which was important enough in later times to merit the raising of an inscribed edict by emperor Asoka. Surface finds at Maski yielded a cylinder seal of a type known in Mesopotamia in the early third millennium BC. There was a small amethyst bead at another Neolithic-chalcolithic site. Amethyst occurs as lumps and beads at Mohenjo-daro and Chanhu-daro but this does not prove any contact between the two regions. At Piklihal occurs a bronze chisel of Harappan type.

Some Indian scholar point to the possibility that Harappan interests could have sporadically extended into northern Karnataka for the gold and precious stones that occur there and further south. Archaeological evidence is, however, against this presumption. Gold and precious stones were available to the Harappan within their own realm and there does not seem to be any reason for their venturing into foreign lands of which neither they nor their ancestors have had any knowledge.

The relationships of the Indus people with the peoples of the East must be put in perspective. Compared to the interaction with the west, the relations of the Indus Valley with the East were neither extensive nor expansive. The archaeological evidence shows that whatever interaction the Indus people might have had with the peoples of the East, it was the result of the former's expansion activities along the borders of the Indus Valley rather than the interaction between cultures. A second point to remember is that much of this expansive interaction took place rather quite late in prehistory. This was probably the reason that all the cultural and technological developments that were taking place in the Indus Valley and to its west in the Turanic and Central Asian region left the eastern borderlands virtually untouched. Geography, i.e. the presence of the Thar desert, the thick jungle and marshlands at the northern tip of the Thar, the vast spans of salt deserts on the southern tip of the Great Desert, etc. was, of course, a potent factor.

For all practical purposes, the eastern borderland appears to be a cultural hinterland during and prior to the Harappan Civilization. There might be some cultural and technological activities in the peninsular India but this region had been inaccessible to the Harappans for the presence of the Thar

which posed a formidable barrier between the Indus Valley and the rest of the Indian subcontinent. In the neighboring Rajasthan and Malwa we find simple food-producing cultures mixed with huntinggathering communities utilizing stone tools, with some knowledge of copper. Looking at the archaeological evidence, one does not find any sustained interaction between these people and those of the Indus Civilization beyond the finds of stray cache of beads and copper tools. The area to the east of the Indus Valley remained a mix of food gathering and basic food producing people throughout the time period of the Harappan Civilization, in fact into the time period well beyond the blooming and wilting of the Harappan Civilization.

Northern Peripheries: Around Srinagar in the Jhelum valley lied some early food producing (neolithic) villages like Burzahom and Gufkral, who were the contemporaries of the Harappans. They lived in pit houses that were scooped out of the soft *karewa* soil, the roof supported on wooden posts around the rim of the pit. The villagers kept herds of sheep, goat and cattle, and grew wheat, barley, lentils and peas. In the later Neolithic levels at Burzahom, when people started to live in mud houses above ground level, along with the local grey and brown hand-made pottery, awls, needles and pins of polished bone, and ground stone axes, are two interesting finds. One is a pot with an orange-red surface and a painted motif representing the stylized and exaggeratedly curved horns of an animal, in the Kot Dijian style. At a higher level (thus later) was found a pot containing about 950 carnelian beads, both pot and beads clearly non-local in origin, and on display at the National Museum, Delhi. This and a few copper arrowheads and tool fragments support the argument that this forested mountain valley was visited by the Harappans in search of mineral wealth.

The northern Neolithic culture remained well and alive throughout the Indus Civilization although gradually it did come under the influence of the Harappan tradition and got submerged into it. The northern Neolithic culture penetrated deep into the Pothwar region and therefore it was geographically connected with the core area of the Indus Civilization. And since there was no physical barrier between the two cultures, a strong interaction between the two is quite probable. We need to consider the possibility that the domesticated plants and animals of the Kashmir village economy came


A bone needle, highly polished and sharp end on one



from the Harappan area. At the same time, some artifacts were found at Harappa which seem to come from the northern Neolithic culture. Thus, there appears to be an active give-and-take between the two. The exquisite bone tools and the technology of making them as practiced by northern Neolithic

peoples must be of considerable importance and novelty to the Harappans. A political frontier may well have developed between these two culture areas that blocked northward expansion of the Harappan system into areas with good soils and higher winter rainfall.

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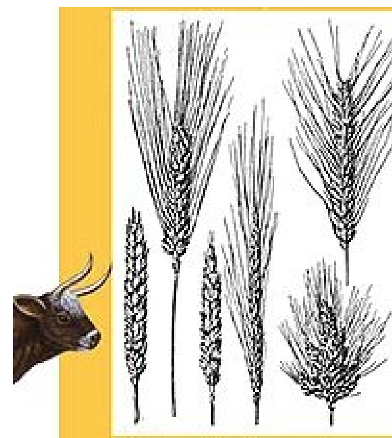
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Chapter 11.

Subsistence Economy
Subsistence Economy

Chapter 15

Subsistence Economy

The subsistence econSubsistence, to an archaeologist anyway, refers to the suite of tions. For example, Wheeler in his discussion of omy of the Indus Valley farming simply catalogued the recovered seeds andbehaviors that humans use to feed themselves. Subsistence has been intensively those assumed to be present based on the interpre

studied (see Volume II, A economy of a civilization, therefore, is a diffused subject and istation of artifact form or pottery designs. Three field not amenable to a systematic analysis. Still, anthropologists and crop species (wheat, barley and peas) and three but in the Harappan peother food species (melons, sesame and dates)

riod,
which
is
the
main
other social scientists have tried to put some order in the study of were then recorded from archaeological finds. Cot

topic of this volume, theman's quest to feed himself and his growing family. Three ton cloth was taken to imply cotton cultivation. On distinct ways of acquiring food by humans have been identified,the basis of artifact form, coconuts and possibly with their highly visiblepomegranates were suggested to have beenalthough no one has so far been able to see any of them in their remains have tended to

pure forms:
known, while bananas were inferred on the basis of ceramic decoration.
Fairservis and subsequently numerous other attract much more attention than the underlying economic base of their being. This situation is being
1. Hunting, fishing and gathering of food in the wild partially rectified in recent years but the overall picscholars reconstructed agricultural practices from 2. Pastoralism, that is, raising of domesticated animals.
ture is still skewed in favor of the urban settlements. settlement patterns and the position of sites in relaIn the absence of any in-depth study of the Haraption to local features of topography and soil types.3. Agriculture, that is, producing food through selective breeding of domesticated An early attempt to synthesize the available arplants pan agriculture, a prime source of information is the
studies that pertain the development of village farmchaeological evidence within a broader South

Asian
ing societies in the pre-urban period. Here, a matecontext was prepared by Allchin (2). The botanistIn the context of the Indus Civilization one must ponder over several points. First, what
rial continuity is, obviously, assumed. Additionally,
because of its generally riverine characteristics, the chaeobotanical evidence in
subsistence base of the Indus Civilization is intui
Hutchinson (3) considered the then known ar
was available for hunting and gathering and what role hunting, gathering, fishing, andrelation to cropping scavenging played in the subsistence economy of the people. Second, what was theseason and modern crop geography, to argue that tively
nature of pastoralismwith that of Mesopotamia andand what role the pastoral nomads played in the overall compared the basic agricultural systems of the various parts of Egypt and this furnishes us quite valuable informasubsistence regime of the Harappans. Third, what was the nature of agriculture and Pakistan and the surrounding areas were already
tion. Although the conditions in the Greater Indus established in prehistory. Fuller and Mandella haveanimal husbandry, which includes, among other things, the cultivated crops, the level of
Basin were considerably different from those of recently reviewed these issues in a lengthy paper inagricultural technology, the tools of farming, irrigation, and the like. Fourth, what were
Mesopotamia and Egypt, there is still a lot that we *Indian Archaeology in Retrospec* t (4). A useful additthe factors that promoted the rapid expansion of agriculture in the Greater Indus Valley
can learn from a judicial comparison of various tional reading in connection with agriculture and
and made the realization of 'surplus' possible. Fifth, and probably the most important, is
Bronze Age civilizations. Another source, although animal husbandry in the Harappan Civilization is a
conjectural and rather weak, is the study of thethe question of the social potential of the Harappan agriculture for producing a sizable 2003 collection of papers edited by Steve Weber peasantry of the present-day Pakistan and the (5). There are also a few other reviews, to be cited
analysis of some of its material and social practices.surplus and the methods of its appropriation for the use of non-producers in the cities.

The role of Harappan peasantry is as important as the other factors enumerated above. as we move along. Here the assumption is that some of the subsistent The archaeobotanical evidence from HarapIn the following, we shall try to approach some of these topics with the aim of shedding
practices of the Harappan period may have continpan sites and those in contemporaneous, adjacent
some light on the subsistence economy of the land and its role in the rise and sustenance
ued well into the modern times. The emphasis is on
of the urban cities of the Indus Civilization.
the use of commonsense rather than looking for
concrete data from excavations.

Hunting, Fishing, and Gathering subsis

tence economy, at least on a small scale, has been
regions has grown considerably since the first finds at Mohenjo-daro but It is only in the last three decades that there has been sufficient evidence from a number of sites to allow generalization and theorization about Harappan agriculture. Although the

a component of Indus Valley archaeology since theAnthroplogists tell us that a hunters-gatherers society is one whose primary subsistence available evidence is still very sparse for such a

first excavations at Mohenjo-daro, Chanhudaro and large area, especially for sites in core areas like themethod involves the direct procurement of edible plants and animals from the wild,
Harappa in the 1930s and 1940s. For the first sevriver floodplains of Sindh, and much of it comes using foraging and hunting, without significant recourse to the domestication of either.
eral decades, however, this evidence remained from unsystematically collected samples, it is at
haphazard, collected by hand when chance led to
Fishing naturally falls into this kind of activities. Harappan Civilization was by no least possible to place our understanding of Harap
means a hunting-gathering society; in fact far from it. Such groups, however, existed
the finding of charcoal rich pockets in the archaeo

logical record. Such finds were then sent to bota
nists, who generally had little knowledge of the ar
chaeology, and who provided species lists, with little
interpretation. Early discussions of Harappan agri
culture were based upon these few botanical as
semblages and guesswork based on artistic depic
pan agriculture into an interregional context and to begin to assess its potential impact on broader historical pattern in Pakistan.

Three distinct ways of acquiring food by humans have been identified, although no one has so far been able to see any of them in their pure forms: 1. Hunting, fishing and gathering of food in the wild

a significant portion of the subsistence to the whole society, in one form or the other. Hunting, fishing, and gathering therefore constituted a vital part of the Harappan subsistence economy.Ancient Pakistan - An Archaeological History

have included foxes, leopards,

2. Pastoralism, that is, raising of domesticated animals.
3. Agriculture, that is, producing food through selective breeding of domesticated plants. This chapter is mainly concerned with the state of agriculture in the Harappan society. Animal husbandry is an integral part of this regime and so it will be a part of our deliberation. Hunting, gathering, and fishing have been known to be a supplementary source of food in all early civilizations; we shall look into it in context with the Indus Civilization but rather briefly.


century, however, this
possibly ass, in the Early Harappan period. Another

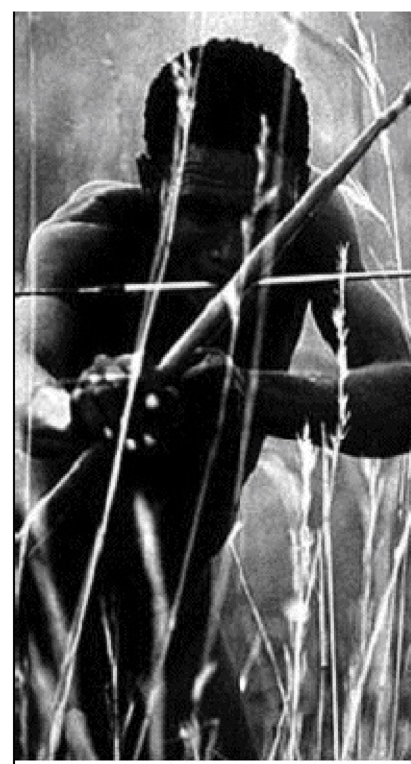
pattern survived only in marginal areas
species whose bones are of frequent occurrence at more than one site is the Indian boar,
of Pakjistan, the areas that farmers and
Szis cristatus,
HUNTING AND GATHERING
herders were not able to or interested in exploiting. Its remnants are still pervasive in the
which must have been regularly hunted. The buffalo
current economy of the land, as a certain part of subsistence, however small or however) is another
such species, but its Anthropologists tell us that a hunter-gatherers bones are less comseasonal, is still derived from hunting,
fishing, and gathering of wild fruits in the rural society is one whose primary subsistence method mon. There is a wide
areas of the country.
involves the direct procurement of edible plants and range of wild deer
animals from the wild, using foraging and hunting,In the early times of human existence, the hunting and
without significant recourse to the domestication ofgathering way of life was highly mobile. Most of theseedly hunted for food:
either. Fishing naturally falls into this kind of activigroups moved their camps several times a year and had only these include the

ties. Harappan Civilization was by no means a sambar deer (*Rusa*
temporary dwellings. The number of people living in a camp
hunting-gathering society; in fact far from it. Such *unicolor*), the spotted

groups, however, existed within the complex social
also varied throughout the year depending on the local food
deer and the hog

structure of the urban culture of the Indus Valley supply. Material possessions were generally few and light in deer. From Amri
and the interaction of these groups with the settledweight so that they could be transported easily. Subsistence
agricultural and urban populations provided in onetools included such things as simple digging sticks, baskets, stance of the rhinoc
form or the other a significant portion of the subsisspears, and bows and arrows that could be easily replacederos, of interest be
tence to the whole society. Hunting and gatheringwhen needed. Because of their temporary dwellings, no cause it is depicted

therefore constituted a vital part of the Harappan on the seals, and reSubsistence Economy!
subsistence economy. records of hunters, gatherers, and fishermen are found inmained a native of

While some of the animals were probablyarchaeological record. However, their stone tools, which within the complex social structure of the urban culture of the Indus Valley and thethe Lower Indus val
hunted by villagers and city dwellers, game may they used in their daily life, abound. This gives us some ley at least until theinteraction of these groups with the settled agricultural and urban populations provided also have been brought in by hunter-gatherers. Alclues about their technological prowess. So are somea significant portion of the subsistence to the whole society, in one form or the other. though the fourth-millennium farming settlers may scattered bones of animals which they left behind. TheseHunting, fishing, and gathering therefore constituted a vital part of the Harappan
have absorbed or displaced the subsistence economy.give us an inkling about their animal food which was hunter-gatherers who lived in theavailable to them or the one which they preferred. At one time, foragers lived on all parts areas that they began to cultivate, Apartfrommeat, hunter-gatherer groups continuedHunting, fishing and gathering is important in the subsistence economyof the Greater Indus Valley; their to flourish elsewhere. For example, of the
Harappans in two important ways. First, the hunting-gathering groups were active wild animals beexistence in Pothowar, northern the Harappan agriculturists never partners in the exchange system of the agriculturists, pastoralists, and the city dwellers Baluchistan, coastal areas of Las Bela, did colonize the area of the Punjab useful for obtaining other valuable, non food, commodities.

during the Harappan Civilization, probably because of its well established hunter-gatherer popu lation and the lack of sufficient wa ter to sustain meaningful agricul tural activities. The same case seems to be about the northern

of their respective areas. The subsistence of the villagers and townspeople was thus

and the region around Rohri Hills is between the Ravi and the Indus directly advanced. Second, the Harappans peasants and pastoralists engaged in hunting, archaeological proven. In fact, prior to

Some game may have



the invention of agriculture around been taken for their

Page 433 10,000 yearspelts, for use in makingago, almost all people clothing, or as covers lived in this way. By the early 20th

and
rugs.
century, however, this may subsistence These
desertpattern survived only in marginal areas tigers,of Pakjistan, the areas that farmers and while the well-watered areas along the rivers and At one time, foragers lived on all parts
lakeshores were home to nilgai, wild boar, water
of the Greater Indus Valley; their
buffalo, wild cattle, elephant, chital, barasinga, and

existence in Pothowar, northern other deer. Wildfowl were also available around wa
Baluchistan, coastal areas of Las Bela, ter, and particularly on Lake Manchar and other in

land
water
reservoirs,
such
as
and the region around Rohri Hills is those around archaeological proven. In fact, prior to
Mehrgarh. There were also other birds that made
the invention of agriculture around

good eating, such as francolin, partridge, pheasant, 10,000 yearsjungle fowl, grouse, and peafowl. Even lizards were
caught and eaten.

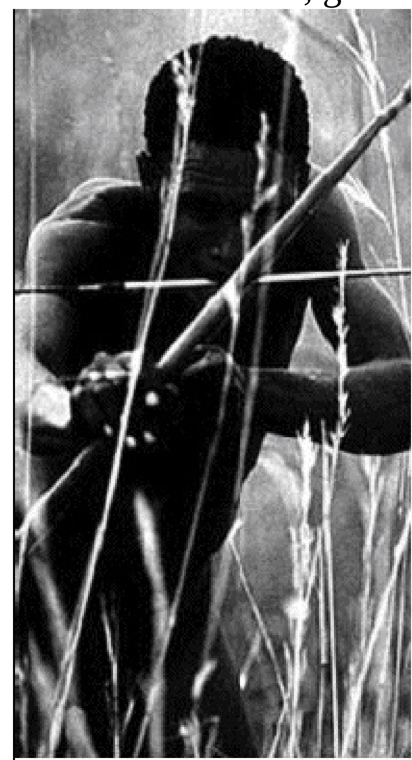
ago, almost all people

lived in this way. By the early 20th There are wild varieties of sheep, goat, and subsistence plains of Gujarat. There is, however, strong evi herders were not able to or interested in exploiting. Its remnants are still pervasive in the and Asiatic lions; wolf dence that the Harappans traded with these hunter current economy of the land, as a certain part of subsistence, however small or however bones in several settlements in Gujarat, and those
gatherer communities, thus gaining access to wildseasonal, is still derived from hunting, fishing, and gathering of wild fruits in the rural products including those of more distant areas vis areas of the country. of a black bear at Amri. Crocodile skins might also ited by hunter-gatherers in the course of their sea have been valued. Rhinoceroses were probably sonal movements to exploit different resources. In the early times of human existence, the hunting and hunted for their horns and hides: Rhino bones are

Many types of game animal such as chinkara gathering way of life was highly mobile. Most of theseknown from a large number of settlements, includ and other gazelles, onager, wild sheep (urial), wild groups moved their camps several times a year and had only ing Harappa, Nausharo, Kalibangan, Lothal, and goats (Persian wild goat, markhor, and ibex), blacktemporary dwellings. The number of people living in a campSurkotada. Elephants were killed for their ivory. buck, and other antelopes lived in the hills andalso varied throughout the year depending on the local food Boars' tusks were also usable as a type of ivory and grazed in the scrub and grasslands of the plains,supply. Material possessions were generally few and light in boars' bristles for fine brushes such as those used

weight so that they could be transported easily. Subsistence for painting pottery. Porcupine quills could be used
239 tools included such things as simple digging sticks, baskets, spears, and bows and arrows that could be easily replaced when needed. Because of their temporary dwellings, no

records of hunters, gatherers, and fishermen are found in

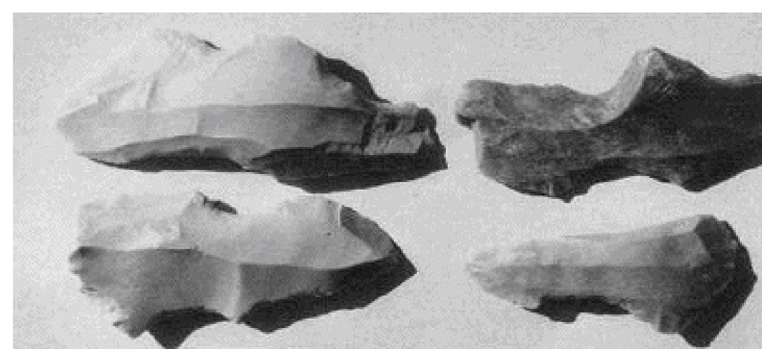


had in abundance and there is
some archaeological evidence for

this. Harappan Civilization - The Material Culture

to make piercing instruments such as needles and
There are wild varieties of sheep, awls. Antlers made a useful raw material for manu
goat, and possibly ass, in the facturing tools and handles: the antlers of Kashmir
stag and sambar were utilized at Harappa andEarly Indus period. Another
Mohenjo-daro, along with those of chital and hogspecies whose bones are ofdeer at the latter site.frequent occurrence at
more than Wild plants were also important. It may have
, which must have been regularly hunted. The
been through familiarity with the range of local flora
) is another such species, but its bones are less common. There
that some summer-growing plants were brought

under cultivation, introducing the innovation of *kharif*), the spotted deer and the hog deer, and several varieties of agriculture. In this way rice, some millets and people of the Indus Civilization consumed these fruits wherever they were available. It has been suggested that wild plants were collected particularly when cultivated crops were unable to supply the full needs of the community, either because of bad harvests or because of population increase in the region. More than a dozen species of wild plants were utilized at Harappa; and the balance between wild and domestic plant foods was likely to have been regionally and locally variable.Subsistence Economy**!**


Toothed micro-blades of hunters-gatherers or

Toothed micro-blades of hunters-gatherers or early agriearly agriculturists found at Mulri Hill, near Karachi

pulses, and a number of vegetables are likely to have first been incorporated into the diet and then added to the range of crops.

Fruits such as jujube, almond, and pistachio were gathered. Early and Mature Indus sites have produced evidence (through seeds) of the date, jujube (*ber*), grape and melon. The first two have been found at the earliest inhabited levels of Mehrgarh; the other two were new additions, possibly transmitted from the Helmand basin. The existence of pistachio, almond, and plum has been tesPage 434 tified in Baluchistan even before the Early Harappan

period. Thus, there is no reason to doubt that the


Indus fisherman with two fishnets, a depiction on a I**ndus fisherman with two fishnets, a depiction on a pot**
potsherd from Harappa
sherd from Harappa

fishing and gathering themselves. A cursory look at pre-industrial societies, which have lasted in many places till recent times, has indicated that these peoples did not only depend on agriculture and pastoralism, they supplemented their food by fishing, hunting

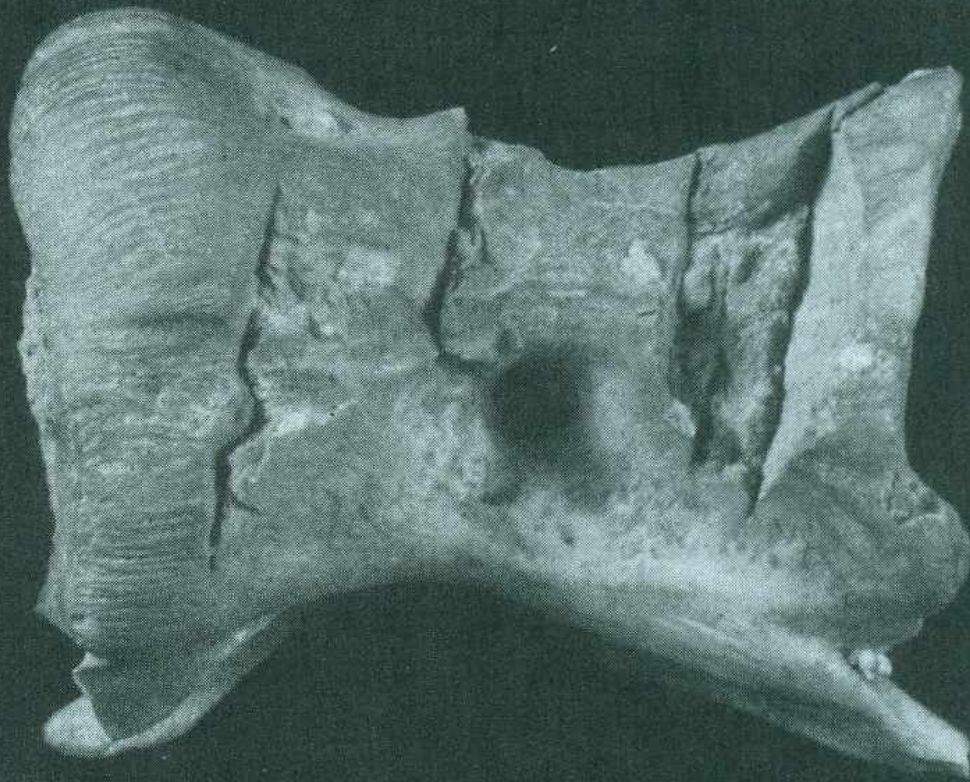
The history of the exploitation of aquatic resources
and gathering. Such practices were prevalent in all those evolving cultures which we
is obscured by the frustrating paucity of wellhave come to known in different parts of the world. The evolution of Harappan urbanreported faunal collections from prehistoric sites in
centers in the midst of agricultural economy, flanked by pastoral nomads and diverse
the Greater Indus region. At the exemplary site of
hunters-gatherers bands, presented a similar situation. The depiction of certain scenes on
Mehrgarh the remains of fish were rare despite the
the Indus seals and tablets show that encounters with wild and ferocious animals were a
proximity of the Bolan River, and the reported re

familiar fact of life. There is no doubt that small hunt was also plenty. The bones of such animals at almost Harappan site is an evidence for this supplementary food source. It is assumed that wild fruit could be had in abundance and there is some archaeological evidence for this.

There are wild varieties of sheep, goat, and possibly Early Indus period. species whose frequent occurrence at more than

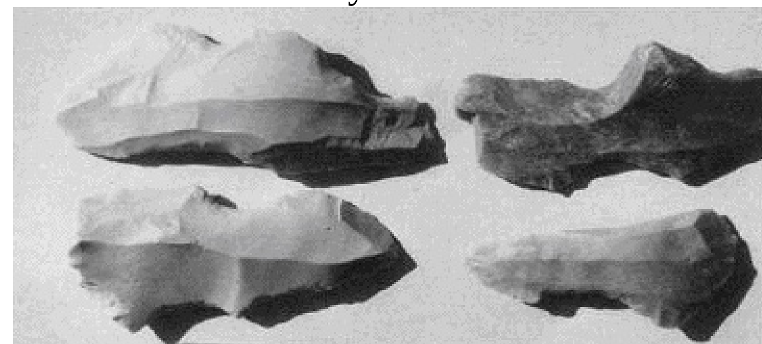
one site is the Indian boar, *Szis cristatus*, which must have been regularly hunted. The
buffalo (*Bubalus bubalis*) is another such species, but its bones are less common. There mains from other Neolithic and Chalcolithic sites in
is a wide range of wild deer which were undoubtedly hunted for food: these include the
Baluchisdtan do not suggest a tradition of exploiting
Sambar deer (*Rusa unicolor*), the spotted deer and the hog deer, and several varieties of tortoise. From
riverine resources. The absence of fish in the
Amri comes a single

coastal settlement of Balakot during the Early



instance of the rhinoceros, of interest Harappan periods suggests that the pastoralists from Baluchistan who settled there had no in

because it is depicted on the seals, and
terest in the locally available marine resources.
remained a native of the Lower Indus
In contrast, the presence of seashells at inland
valley at least until the fourteenth century
A.D.
sites such as Mehrgarh, brought there through
exchange networks, indicates that from early times there were coastal communities who did
Fish were also a ready source of food for



exploit marine resources, for raw material if not
the Indus people, although the evidence in
for food. Many fish bones were found at theToothed micro-blades of hunters-gatherers or the Harappan period is rather scanty. In early agriculturists found at Mulri Hill, near coastal area, coastal settlement of Balakot, where there was

sea fish were probably
also a major industry, processing shellfish to Karachi caught by professional fishermen. Many
make shell bangles and other objects. Similarly, fish bones were found at the coastal settlement of Balakot, where there was also a major
the decoration of pottery with fish motifs indi
industry, processing shellfish to make shell bangles and other objects. One of the most
gatherer communities in the Indus Valley. Fish

A bone of the sua fish *(Protonibea diacanthus)*, from the coastal settlement of Balakot where fishing was important. This fish comes inshore to spawn during the summer monsoon period

when it is readily caught, even today, by fishermen using tradi

significant recent hypotheses in this field is that dried sea fish the Makran coast used to
bones were among the faunal remains at the
be traded as far upstream as Harappa. A recent study suggests an organized exploitation
Hakra period site of Jalilpur on the Ravi River
of molluscs for food, at least in Gujarat. Freshwater fish must be abundant in the rivers

and terra-cotta net sinkers at several Harappan and the channels that fed them. Nets were used, as is vividly depicted on one sherd of
sites indicate that fishing was practiced.

pottery from Harappa, and even in the Early Indus period at Jalilpur in southern Punjab.

tional methods. Cut marks on this bone reveal details of butchery which can be compared with modern butchery practices to suggest patterns of exploitation. (William R. Belcher)

The faunal remains from the coastal settle
ment of Balakot and from Harappa far inland

near the Ravi River have been examined in detail, providing a complementary picture of the exploitation of marine and freshwater resources. A large selection of marine fish was exploited at Balakot, including requiem sharks, stingrays, wolf herring, sea bream, mullet, and drum, but they concentrated on a few species, particularly marine catfish, mackerel, and various types of grunt. The range of fish varied seasonally, with few species being available in winter but many coming in close to shore in the summer and autumn to spawn, making them easy to catch. The grunt, however, spawns during the winter and could be easily caught with stationary nets set up in the shallow waters of Somiani Bay where Balakot is located. A similar range of marine fish was found at Allahdino, along with freshwater catfish.

Examination of the cut marks on fish bones at Balakot shows that they were butchered with knives probably of copper rather than stone. The heads were removed, probably to be boiled up in a soup or stew until the meat fell off. The virtual absence of all bones but the vertebrae at Allahdino suggests that the fish were butchered before they were brought to the site by nonresident fishers; in contrast, the full representation of bones at Balakot indicates that this was a fishing settlement where the catch

was processed.

Evidence suggests that as well as being eaten fresh, fish were dried or salted so that they could be eaten later or elsewhere. At the tiny site of Prahag, west of Balakot along the Makran coast, where sherds of Harappan and local pottery are known, evidence was found of fish processing on a large scale. Skate, jack, grunt, marine catfish, drum, and small shark appear to have been caught locally, probably from boats using a hook and line. They were then cut open and the heads and tails removed, as well as part of the vertebral column of the skates and sharks; they may then have been preserved by salting or drying. Bones of marine catfish and jack at Harappa show that preserved fish was transported even this far inland, more than 850 kilometers from the coast. Similarly, abundant bones of shark, marine catfish, drum, sea bream, and jack at Miri Qalat in Baluchistan, 120 kilometers of difficult terrain distant from the sea, also provide evidence of a flourishing trade in preserved marine fish: In modern Baluchistan dried fish are used not only for human food but also as fodder for animals. Probably only a limited range of species were distributed in this way. Grunt *(Pomadasys hasta)*, the predominant fish at Balakot, are often preserved by salting in modern times

The remains from Harappa show that the range of freshwater fish was more restricted than that available from the sea. Here the main species exploited were four types of catfish, though various types of carp, snakeheads, and spiny eels were also important. The distribution of the remains at Harappa shows that some households consumed large quantities of fish while others ate little. At Nausharo in the Bolan Valley, carp and catfish were also the species of fish caught.

The Harappans probably used similar techniques to those of modern fishers in the region, who catch some fish close to the shore and others farther out to the sea, using fixed nets particularly for large fish and cast nets for smaller ones; some nets are also set on the sea bottom to catch crabs and other crustacea. Farther south in Kutch, fish might also have been caught, as today, using tidal traps into which the fish swam when the tide was up and in which they were caught as the tide went out. Analyses of the types and condition of the shellfish from coastal settlements confirm that fishing also took place from off-shore boats.

Nets were the principal fishing device, used on the side channels, oxbows, and lakes. The bottom of the nets were weighted down with terra-cotta net sinkers, similar to large beads but exhibiting a characteristic wear pattern from the chaffing of the string used to secure them in place along the edge of the net. These have been found in many Indus settlements. A sherd of pottery from Harappa depicts a fishing scene, in which a man stands among fish, holding one or several nets, while along the foot of the scene runs a large net presumably surrounding an area of water in which the fish have been trapped.

During the period immediately after the inundation when the rivers were still high and turbulent, fish could be caught in the shallow areas along the banks of the main rivers, using hook and line. While simple hooks had been in use since earlier times, the Harappans were probably responsible for developing the barbed fishhook, which also had a looped end to which the line was fastened. Copper fishhooks have been found at Mohenjo-daro, Harappa, and Chanhu-daro.

The banks of the main Indus River were too friable and the current too swift to make it safe to fish there, but fish such as carp and catfish were caught in the backwaters and smaller channels, where water flow was slow, particularly during the winter and spring. The Ghaggar-Hakra channels were far less turbulent, and it is probable that the inhabitants of many of the settlements along their banks

would have caught fish from it. Channels cut for irrigation or drainage might also have yielded fish. Fishing could also have taken place in the rivers and streams of Baluchistan; the pools that form in the dry season on the Hab River in the Kulli province are today a rich source of fish. Fishing was also a major occupation in the oxbows and lakes of the Indus Basin, particularly Lake Manchar, but also in the seasonal dhands whose fishstocks were replenished by the annual flood-waters.

ANIMAL HUSBANDRY

The range of domesticated animals is quite large in the Harappan remains and they played a major role in Indus agriculture. In addition to sheep and goats there is repeated evidence of the predominant role of cattle, their relative importance relating to local environmental conditions and cultural points of reference. The rearing of domesticated animals was a useful investment against crop failure. In good years, when crop yields were high, grazing would also be good and the number of animals that were kept could be increased, surplus agricultural produce being available as fodder if the grazing ran out. In lean years, when grazing was limited, the additional animals could either be killed



A Zebu bull from Dhanni area in Pothwar, northern Punjab

stored by those in authority, though the evidence of central storage is limited and dubious. Animals were also important for



irrigation. Model yokesthe haveyear been found at the subsistence economy round. Pastoral nomads are largelyNausharo. Other uses for cattle included threshing of the Indus Civilization in self-sufficient in terms of food and grain and carrying goods as pack animals.

several other ways. They Another bovid that may have been exploited

most other necessities but they do

provided milk for food, they yielded hides for leather, they gave wool and hair for textiles, they furnished fertilizer for fields, and, of course,



by the Harappans is the gaur (Indian bison, *Bibos*

need exchange opportunities with Wild gaur now inhabit hilly areas in peninThe yearly migrations of pastoral nomads, the

**A Harappan seal, depict
ing a zebu bull**

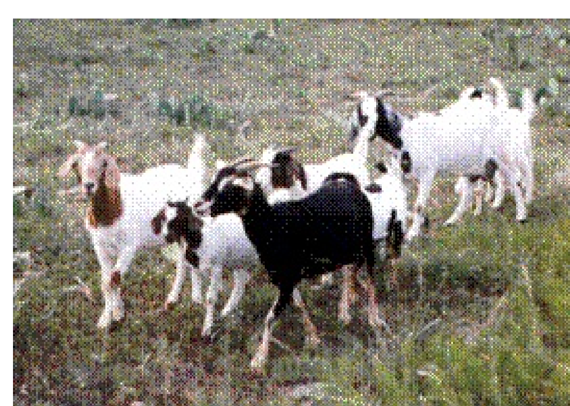
the peasants and city dwellers forsular India but may also have been found in the between Afghanistan and Pakistan haveIndus Valley in prehistoric times. No bones from*Pawindas,*
the procurement of certain other been a common sight until very recent timesIndus settlements have been identified positively as essentials, such as metal tools and gaur, but there are representations on a number of

some of them pulled the carts and worked the plough.

Cattle: Cattle were the main domestic ani mals of the Indus farmers, their bones constituting half of those found in Indus sites; at sites in Gu jarat, they constitute even two third of the total. This set a pattern that has continued up to the present day when South Asia has the highest den sity of cattle in the world (182 per square mile). Cows were probably kept for their milk and bul locks for drawing plows and carts, threshing, and raising water, while a few bulls would be main tained for breeding. Bones recovered from Indus sites show that many cattle were also killed for meat: they bear butchery marks and are often burnt. It is perhaps worth emphasizing that the weight of meat obtained from a cow or a bullock is very much greater than that provided by a sheep

or goat: A ratio of around 50 percent cattle in the faunal sample therefore implies that the bulk of meat consumed came from cattle. Cattle dung was probably used for fuel and mixed with mud as a

pottery.

**Goats have been the common animal stock of the postoralists**Goats have been the common animal stock of the **of the western regions, whether nomadic or sedentary, from**
postoralists of the western regions, whether no**the time immemorial in the Greater Indus Valley**
madic or sedentary, from the time immemorial in the Greater Indus Valley
242

Their periodic movements occasioned by the need to find new pasture land when grazing is no longer possible in the area currently being visited. In Pakistan, as anywhere else, such movements are responses to the rainfall regime, as, for example, the movement of cattle grazers across the Indo-Pak borders in the Thar Parkar Sometimes dictated by drinking water, as, for example, the movements of goat/sheep grazers all over Baluchistan. These movements are sometimes avoiding severe weather for men and

for food or used to daub applied to wattle walls.

Both the humped zebu *(Bas indicus)* and the humpless *Bas taurus* may have been kept because both appear as figurines in the Indus Civilization and in earlier and later times. Distinguishing the skeletal remains of these species is difficult, though in cases where it was possible it was concluded that only *Bas indicus* was present. It is thought likely that there were a number of different breeds of cattle in third-millennium Pakistan, including smaller and larger varieties. A short-horned bovid depicted on !seals may have been either the humpless bull or Subsistence Economy

the gaur (Indian bison).

obtain other foodof the Indus at multiple directions but two aspects are the most important: the role of stuffs, for examprobably indigenous to Baluchistan and Sindh and pastoral nomads, and the role of animal husbandry in context with

subsistence farming. **ple, by trading is beyond doubt the ancestor of a strain still bred in**
with pastoralists, **Pastoral nomads** **parts of Pakistan, especially in Pothwar. Zener (1)**

by giving the ani

follow a seasonal

has suggested that the zebu may have been de
mals
as
gifts
to
scended from

migratory pattern that can vary

Bos namadicus, a wild cattle which

kin in other areas from year to year. The timing and occurs throughout the Pleistocene period in Paki

in the expectation
stan and Central Asia, and in this case it is probable

destinations of migrations are

of useful return that the center of its domestication may have been gifts, or perhaps

determined primarily by the needs

Baluchistan, just as *Bos primigenius (the humpless*

by exchanging of the herd animals for water and was probably first domesticated in Western
them for grain fodder. Asia or Europe.These nomadic societies

The use of bullocks for traction is vividly illustrated
by
the
many

do not create permanent

terra-cotta models of carts settlements, but rather they live in drawn by a pair of bullocks. They would also have

been used to draw plows and probably provided the

tents or other relatively easily constructed

muscle power needed to draw water from wells for

dwellings
beasts, as, for example, the movement of people and their flocks of sheep across several border crossing points between Afghanistan and the NWFP in Pakistan or between the

seals of a bovid with the short horns and shoulder ridge of the gaur.

Water buffaloes *(Bubalus bubalis)* were probably herded because there are buffalo bones at earlier sites such as Rehman Dheri and Mehrgarh period I. Bones definitely from domestic buffalo are known at Mature Indus sites, including Balakot and Dholavira. However, wild buffalo were probably also still hunted. Buffaloes occur as images on Indus seals, where they appear to be wild. Buffalo milk is richer than cows' milk, having a higher butterfat content, so it is likely that it was made into *ghee*. Unlike cattle, domestic water buffaloes were generally kept in or near the village rather than taken elsewhere for seasonal grazing or used as pack animals. They require daily access to water (river buffalo) or mud (swamp buffalo, the variety present at Balakot) to keep their skins moist.

Although it is likely that milk was used and there is evidence for this from contemporary cultures: in Mesopotamia, artistic representations of milking and textual references to milk and milk products; in Europe, vessels designed for milking and for processing milk into cheese. Studies of the age and sex structure of cattle and caprine populations at prehistoric sites can also reveal evidence that reflects the keeping of these animals for milk as well as for meat and other purposes, but, as far as it is known, no such studies have been published on Indus domestic animals.

Goats and Sheep: Like cattle, sheep and goats were kept for meat and perhaps for milk. It is usually assumed that sheep were also kept for their wool. There is, however, no direct evidence that this was so. Wool is present in wild sheep as a short undercoat, grown to protect against winter weather and shed in the spring. Sheep bred for longer wool appeared in the Near East during the fourth millennium and spread into Europe during the third millennium. The wool of these sheep was still molted in the spring and could be combed out or plucked from the animal or collected after it was shed. In Mesopotamia there is both pictorial and documentary evidence of woolly sheep and woolen textiles from the late fourth millennium onward; in Europe, aside from the very rare surviving textiles, the evidence is in the form of combs for removing the wool from the sheep; flat spindle whorls for spinning wool; a change in the age and sex structure of flocks; and a substantial increase in the proportion of sheep among the domestic stock that were kept. None of these features has been actively looked for in the Indus realms; so the question remains open.

It is perhaps significant that the excavators of Mehrgarh believed that leather was the main material used for clothing in the period leading up to the Harappan Civilization, suggesting that neither wool nor cotton was in use for textiles before the Harappan period. The trade between the Indus and Mesopotamia has always seemed unbalanced, the Indus receiving nothing obvious in return for its exports. If, however, the Harappans did not themselves collect wool, the woolen textiles that Mesopotamia produced on an industrial scale and exported widely may well have been a commodity that was highly prized by and valuable to the Harappans.

The detailed analysis of the faunal remains at Balakot showed that most male sheep were culled at a young age, a pattern suggesting that sheep were kept for meat rather than for wool production. A similar picture may obtain from Dholavira, where a significant proportion of the caprines were killed before or as they reached maturity; though the faunal report did not divide the bones by sex as well as age, it is likely that the sheep kept into adulthood, around 40 percent of the total, were breeding females.

Domestication of sheep (as in many species) had led to or coincided with a diminution in size from that of the wild progenitor. Such small sheep continued into Harappan times, being known, for example, from Dholavira, Nausharo, and Sibri, and they were still present in Kachi sites in the second millennium BC. Much larger domestic sheep at Harappa, however, may show that selective breeding was taking place to increase size. Sheep were kept in far larger numbers than goats at Harappa in the Punjab, a common practice in many communities because goats are less tractable, though often a small number of goats are kept with a flock of sheep, as they are said to calm the sheep and are also useful in leading the flock to pasture. Goats, however, have the advantage of being able to browse on a wider range of plants, so they can find food in more challenging terrain: This probably explains the more equal proportions of sheep and goats at Nausharo, sites in relatively arid environments.

AGRICULTURE

The archaeological evidence for Indus agriculture is extremely patchy. The preservation of plant remains is often poor, depending on local conditions, the type of plant, and chance. Whereas cereal cultivation has left evidence in the form of carbonized grain and impressions of stalks and grains in pottery and bricks, and pulses also preserve well, roots and tubers and many fruits and vegetables produce few or no hard parts that survive as archaeological traces, so evidence of their cultivation is missing. This problem is compounded by variations in the standards of recovery in archaeological excavations and by problems of identification. The preservation of animal bones is somewhat better but here too we have problems. Often they present present identification problems: In addition to the well-known difficulties in distinguishing sheep from goats, Richard Meadow, a leading archaeozoologist, has drawn attention to the strong similarities, for example, between sheep/goat and blackbuck/ gazelle, and among cattle, water buffalo, and nilgai (1). An added difficulty is the regional variation in ecology and environment which skew the archaeological evidence in one way or the other. As a result, evidence from the few sites that have well reported economic data cannot necessarily be regarded as representative of the Indus Civilization as a whole. The picture of Harappan agriculture is therefore very fragmentary, having been put together from very restricted sources, filled out by comparison with traditional agricultural practices in the region.

Crop Distribution During the Mature Harappan Phase: As stated above, agriculture in the Mature Harappan period, as in its antecedent cultures in Baluchistans, was based on wheat, bar

Economy! ley, pulses, sheep, goats, and cattle, the same asat some sites, including the Indus outpost at Shortugai on the Amu Darya and the Baluchi site of Miri Qalat. The Harappans grew three or four varieties of barley, including both naked and hulled types. This range of crop varieties allowed them to exploit the different properties of the various types of land suitable for cultivation. In the Kachi plain bread wheat was more important than barley.

Oats *(Avena* sp.) were present at Mehrgarh in the fourth millennium and have also been recovered from Pirak and Late Harappan Hulas. Oats seem generally to have been present in early archaeological contexts as a weed of cultivation that invaded stands of wheat and barley, rather than being deliberately cultivated. This fits with their sporadic

semblage of crops and domesticated animals as the appearance in botanical samples in the core areaSessamum and mustard were grown - presumably for oil. A find of great interest was a
cultures to the west, throughout the Iranian plateau, of the Harappan Civilization.fragment of woven cotton cloth at Mohenjodaro and cloth impressions on clay at
southern Central Asia, and West Asia.
With a few
Harappa as well as at Mohenjodaro. The fiber belonged to one of the coarser Indus
Pulses: The argument can be made that exceptions, such as sesame and cotton in Pakistan, *Gossypium arboretum*. The fiber had probably been dyed wheat and barley were part of a crop package varieties closely related to.

the crops followed a regime of autumn sowing and which included four likely legume species: *peas/*with madder, indigenous in the Indus Valley but more likely by inorganic dyes derived
from minerals and clays. spring harvest across the entire region from West
Asia to the Indus Valley: this is known as *rabi* culti

mattar (Pisum sativum L., incl. *P arvense* L.), *grasspea/khasari (Lathyrus sativus* L.), *lentils/masur*
The main crops were sown in the winter and harvested in the spring - a system known
vation in Pakistan. Around the early second millen*(Lens culinarius* Med.), and chickpea/gram/chana
in Pakistan today as *rabi*nium, however, major new crops were added that cultivation. A few Indus crops would not have prospered in
(Cicer arietinum L.). Although these species have the *rabi* regime, as they can be damaged by frost - these include both cotton and the
required spring or summer sowing and autumn harnot been reported from the early periods at
vesting:
kharif
important oilseed sesame, as well as various millets. They belong to a complex of crops
cultivation. These crops were to set Mehrgarh (6), this cannot be taken to indicate their
that are sown in the spring or summer and harvested in the summer or autumn. Both
the pattern for agriculture over much of the subactual absence, as the evidence for the cereals
continent in later times, although *rabi* crops havesystems exploit the natural fertility of the alluvium and the annual inundation of thecomes from impressions, a category of remains rivers. The use of river floods in the cultivation of crops is still common in some areas
continued to dominate in Pakistan while in many which one would not expect to include leguminous where it is known as
regions of India both
rabi

sailabi and *kharif* crops are(flood-aided) cultivation. This provides a very convincing crops (8). Unfortunately because there are still few grown.explanation of the means by which the Harappans filled their vast granaries. There are,systematically studied flotation samples from the of course, vast areas where the agriculture depends only on rain. Such a system, calledHarappan phase of the Indus

Site-wise Distribution of crop and plant remains at some Harappan Valley itself, it is unclear the **sites Table 15.1** extent to which each of the **Site-wise Distribution of Crop and Plant Remains at Some Harappan** South-West Asian pulse spe **Sites** cies contributed to the agri

Mohenjo-daro
Chanhudaro
Harappa

culture of Baluchistan and by wheat, barley extension to that of the Ma
wheat, barley, mustard ture Harappan period. wheat, barley, peas (*Pisum arvense*), sesame (*Sesamum* Nevertheless, the avail *indicum*
), rice, and millets
able evidence suggests that each of these species was at

Banawali
Kalibangan
basically unpublished, but wheat reported least present in in the

wheat, barley, chick-pea (Cicer arietinum), pea (*Pisum* Harappan times. These in *arvense*) clude lentil, and chickpea - Shikarpur
Shortughai
wheat, ragi millet and Italian millet in addition to

also originally domesticated in West Asia. Peas are Barley, wheat, millet, lentil, pea, almond, pistachio, known from sites such as grapes,linseed Chanhu-daro, and Harappa, chickpea at Kalibangan, and

barani *Wheat and Barley:* The cultivation of wheat(rainy) cultivation, is specific to certain crops, such as barley in the south and thelentils at Nausharo; chickpeas African millets in the north. are also known at Pirak. Lentils and peas were also and barley probably begun in Anatolia from there it spread to the west as well as to the east, reaching among the plants cultivated at Shortugai, the Indus Table 15.1 lists site-wise distribution of crop and plant remains belonging to the period
the eastern end of the Iranian Plateau, i.e. Baluchisoutpost in northern Afghanistan. Another pulse, also of Indus Civilization. The list is by no means comprehensive and does not discuss the possibly derived from the west, was garsspea. Al tan, by 7000 BC (6), with more recent dates possitechnicalities involved, but it offers a rounded picture of the though remains of this plant are known from a numble pushing this evidence back considerably further variety of crops available to the Harappans. Only the major ber of Harappan sites and at Late Harappan Hulas,to the eighth millennium BC (7). The Harappanscrops for which we have fairly reliable evidence are listed; they it was probably not grown for human consumption,cultivated various types of wheat: a little emmer and
are classified into
einkorn, along with three kinds of bread wheat, of

which shot wheat *(Triticum aestivum sphereococ*Wheat is



cum) was the most common in the Mature Harap
pan period. Barley was more important than wheatPage 444
'rabi' (winter) and *'kharif* (summer) crops.since it is poisonous to humans if eaten in large

quantities. Its recent consumption has been as a frequently recorded infamine or desperation food, and it may have been grown for animal feed.

Legumes seem to have played a minor role in the subsistence of the Harappan people, although Steve Weber suggests that this paucity might be an artifact of previously weak archaeobotanical research in South Asia. However, lentils *(Lens culinaris)* have been identified at Nausharo, and peas *(Pisum arvense)* at Harappa itself. Chickpeas *(Cicer arietinum)* are recorded from Kalibangan, but so far nowhere else. The absence of Near Eastern pulses at certain South Asian sites may, however, be an artefact not of preservation or recovery, but of the difficulty of introducing *Leguminosae* as seed, thus lacking the symbiotic bacteria (*Rhizobium* spp.) required at the roots for nitrogen fixation.

Other Plants: Very few other Harappan cultivated plants have been recovered. The evidence, however, of the widespread cultivation of a species of *Brassica*, brown mustard (Indian rape), and of gourds, is available in the Mature Harappan period. Sesame *(Sesamum indicum* L.), which may have originated in the Indus Valley has been reported from Harappa (2) and a Mature Harappan phase site in Makran. It is known from a number of Harappan sites, including Chanhu-daro and Harappa, and contemporary sites in the Indo-Iranian borderlands such as Miri Qalat. By 2250-2200 BC, sesame was under cultivation in Mesopotamia, presumably first brought there by Harappan traders.

Seeds of the cucurbitaceae have been reported from a number of sites. Melon *(Cucumis melo* L.) seeds were recovered in the early excavations at Harappa. It was probably domesticated in South-West Asia from wild types indigenous to that area, while modem East Asian forms are thought to derive from a separate domestication from tropical varieties. Which type was present in the Harappan region is unclear. Herbs and spices, such as garlic, turmeric, ginger, cumin, and cinamon, are likely to have been grown or collected too, but the only trace yet identified is of coriander at Miri Qalat in Baluchistan.

Fruit Trees: Fruit trees are a category of food plant that almost certainly had a separate history from the cereals and pulses and developed through a different process of arboricultural domestication. Cultivated dates *(Phoenix dactylifera* L.) are probably of South-West Asian origin and the earliest archaeological finds come from Ubaid period Mesopotamia, fifth millennium BC. Date palms occurred wild in Baluchistan and they may have been cultivated from early times. Many date stones were recovered from Nausharo and at Mohenjo-daro, and it is likely that dates were transported to parts of the Indus region where they were not grown. The reported stones from Mehrgarh appear to be broadly contemporary with this Ubaid period Mesopotamia (6). Dates have presumably had a

presence in the Indus Valley ever since, with reported finds coming from Harappa, Mohenjo-daro and Nausharo. Date palms were a common motif on Harappan painted pottery. The domesticated date, important in Paki

occupation. Furthermore, it is not established whether the rice in question is of the wild or domesticated variety. Similarly, rice's presence at Harappa during the Mature period of the Indus civilization is proven in archaeological records but uncertainty prevails about the cultivated stan must not be confused with the Indian wild spe

cies,
Phoenix silvestris
nature of the find. One cannot, therefore, confidently count rice among (L.).the crops raised by the Indus people. From their wide distribution and the Other fruits that came to the Indus Valley large quantities in which their seeds have been found, wheat and barley

from the west were grapes and hackberries. Grapes were being grown in the Kachi plain by the early appear to have been the main food crops of the Indus basin and millets third millennium, as well as in adjacent areas offormed the main food crops in Gujarat, Sind, and the northern Punjab.

Baluchistan and Seistan. Grape pips have been

By the end of the 3rd millennium BC, rice was definitely being grown in the Swat regionreported from Nausharo (9), ca. 2300-2000 BC, as well as in Post-Harappan contexts in the Swat Valbut it was at best at the tail end of the Harappan Civilization. It is not clear yet how rice ley, such as Loebanr 3,was introduced to this region and what prompted the Indus people of this region to

Burzahom in Kashmir after
ca.
1700 BC. In addition,
cultivate this crop. One theory is that the Indus people received rice from China through
the cultivation of grapes is suggested by wood
the Pamir or Hindu Kush passes. Since the Swat region lies at the southern end of this
charcoal from Baluchistan as well as Punjab.
traffic, this theory seems to carry considerable weight. Another theory, popular among Several fruits native to Baluchistan may have
some Indian scholars such as Vishnu-Mitre, is that rice was introduced to the Indus
already been present in the Greater Indus Valley or
Valley from the Ganges Valley during or even prior to the Harappan period. According
else derived from further east in Sindh. *Indian Ju*
*jube (ber)*to this hypothesis, rice was indigenous to central and lower reaches of the Ganges
available locally, as the widespread occurrence *of* Valley where it was domesticated. In this connection, a fantastic timeline of the 7th
Zizyphus
wood charcoal attests. At some undeter
millennium BC is offered. We know, however, that the introduction of agriculture is

mined period, this species was brought into cultivavery late in India and in view of this proven timeline, the rice cultivation the Gasngetic
tion and diffused westwards to South-West Asia, plains could not have happened prior to the second

millennium BC. If rice is indicated

Egypt and sub-Saharan Africa (11). The only early
archaeobotanical evidence for
Citrus
in any archaeological remains there, it must be at best a wild, non-cultivated variety.
fruits comes
from the Late Harappan (Bara phase) site of SangAnother theory is that rice came to India from China through its eastern regions, where hol in Indian Punjab where seeds of lemon (c.its cultivation is proven in the 4th century BC In this case, rice could have been
(L.) Burm. f.) have been reported. There is no sign
introduced to the Indus people through a diffusion process from northern India or from
of citrus fruit in the Harappan Civilization, though.
Gujarat, probably during the Harappan Civilization itself. Or somewhat later.
Cotton, Flax, and Jute:
Cotton:
Although
disagreements
Charred cotton seeds have been found at Mehrgarh, dating
persist; there are plausible
prior to 5,000 BC. These are indeed the earliest samples found so

arguments for the origin of
far anywhere in the world Whether these seeds came from a
one of the old world cot

cultivated variety or from the cotton that was gathered in the wild,
tons, the tree cotton
is, however, *(Gossypium arboreum* L.),not known. There is good evidence of the use of cotton cloth at Mohenjodaro as well as at Harappa, c. 2500 BC.
although the wild progeni
Gossypium-type pollen has been found at Balakot. This sample
tor populations may nowcame from layer IV, which places it rather late in the Maturebe extinct. Early evidence
Harappan sequence, somewhere around 2000 BC. McKean argues
of cotton seeds has been
reported from Merhgarh,as effectively as she can that this pollen resulted from cultivated ca..
5000
BC
cotton. A single carbonized cottonseed was also found at Hulas; it
(6). These
also belongs to the Late Harappan or Pos-urban Phase. Thus, archaeological data do not
are indeed the earliest sam
ples found so far anywhere in the world. Whether offer us any certainty of cotton cultivation in the Early Indus or Mature Indus periods,
these seeds came from a cultivated variety or from
although its presence and use is in evidence as far back as 5,000 BC.

the cotton that was gathered in the wild, is, however, not known. Although some concern may be warranted given the uncharred preservation of this Page 447
find, the date is approximately as should be expected given that cotton had reached the Arabian peninsula by ca. 4400 BC (12), although cotton cultivation in Mesopotamia is not documented until much later in the first millennium BC.

There is good evidence of the use of cotton cloth at Mohenjo-daro (13) as well as at Harappa, *ca.* 2500 BC. *Gossypium*-type pollen has been found at Balakot (14). This sample came from layer IV, which places it rather late in the Mature Harappan sequence, somewhere around 2000 BC. McKean (14) argues as effectively as she can that this pollen resulted from cultivated cotton.Nevertheless, archaeological data do not offer us any certainty of cotton cultivation in the



spontaneous and the commercial demands could be colossal. Thus, the claim that the Harappan Civilization arose on a ‘cotton rush’ may not be as farfetched as it sounds.Harappan Civilization - The Material Cultureweight to the notion that Indus exports, including Early orSomewhatbetterdocumentedarchaeobo presence and use is in evidence as far back as tanically is flax/linseed *(Linum usitatissimum* L.), 5,000 BC. A better evidence for cultivation, seeds,which is of South-West Asian origin and was incor

have only been reported from Hulas in the Late
porated from an early date into the Neolithic pack
Harappan, 1800-1300 BC, and Loebanr 3 in Swat.
age of the fertile crescent. Although the cereals and
In spite of the absence of any direct evi
most of the pulses of this package are known from Harappan Civilization - The material culture dence, it is generally believed that the cotton fiber
Urban period Harappan sites, flax has only been

and the cotton seed evidenced in archaeological
reported from Nausharo (48,49). There are numer
record do point to the cultivation of cotton in theLate/Post-Urbanous finds,Greater Indus Valley.however, from theThere is ample reason to be

phase, i.e. early second millennium BC, such as at
of sunn hemp in seed assemblages, especially as
Pirak.
lieve that this plant was native to the Indus basin,
this crop and not a related weedy species, is not yet
lennia for its fiber.
A recent article by Rita Wright and colleagues
really possible, and could prove intractable. Taken

in *Archaeological and*Anthropological *Sciences*
(62) report evidence for the use of jute fiber, based
ton in the Indus Valley, as well as wild silk produc
which is of South-West Asian origin and was incor
on analysis of fiber impressions preserved on a ter
tion (from the Assam silk moth), reported by Good &
racotta sherdporated from an early date into the Neolithic packHarappa. Figure belowal. (17), the Harappan Civilization was quite the
age of the fertile crescent. Although the cereals and
centre of textile crop diversity in the Bronze Ageshows the details of the impression of the woven
(compared to apparently only flax cultivation in con
temporaryUrban period Harappan sites, flax has only beenor archaeobotanists had perhaps long suspected theadds
cultivation of jute fiber, which is native to South
weight to the notion that Indus exports, including
been
ousAsia, in the Indus Valley, seed finds from sites such
phase, i.e. early second millennium BC, such as atthose of the textually known Meluhha merchants of as Rojdi
were ambiguous as whether this species
the Persian Gulf, included a range of cloth types.Pirak.was cultivated, and processed for fibers.

BC.
couple of examples of jute, as well as many of sunnthose of the textually known Meluhha merchants of hempthe Persian Gulf, included a range of cloth types. ported from the Indus to the east.
Unfortunately as Wild fibre sources were also important, and

a small-seeded legume, recognizing the presence
spun and woven net material from Shahi Tump, has
of sunn hemp in seed assemblages, especially as
also been reported recently by Thomas et al. (64).
this crop and not a related weedy species, is not yet
In this case, they appear to be using the local dwarf
Mazari palms.really possible, and could prove intractable. Taken
together with evidence for flax seeds, and cot
Late-Harappan Shift: Although kharif food ton in the Indus Valley, as well as wild silk produccrops, i.e. mainly millets and rice, are not of much tion (from the Assam silk moth), reported by Good & al. (17)
,
importance in the subsistence economy of Mature
the Harappan Civilization was quite the
Harappan, they are of significant importance for the
centre of textile crop diversity in the Bronze Age
Late Harappan period, especially in the peripheral
(compared to apparently only flax cultivation in con
together with evidence for flax seeds, and cottemporary Egypt or Mesopotamia). This adds areas of Gujarat and the Divide. At issue is how we interrelate the material and settlement record with

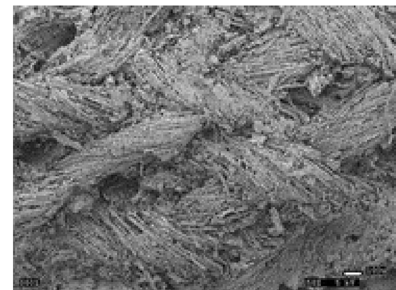
weight to the notion that Indus exports, including such a subsistence data.
those of the textually known Meluhha merchants of the Persian Gulf, included a range of cloth types.The shift toward more localized stylistic at

Changes in the Late Harappan Phase:

tributes and away from urban complexes at the end
Although kharif food crops, i.e. millets and rice, are
of the third millennium B.C. is in parallel with a sub
not of much importance in the subsistence economy
Egyptreported from Nausharo (9,15). There are numerstantial change in agricultural regime, especially in the
of Mature Harappan,composition of thethey are of significant impor
subsistence base. This
tance for the Late Harappan period, especially in
change is often described as being closely associ

the peripheral areas of Gujarat and the Divide. At ated with, or even stimulated by, a revolution in ag
issue is how we interrelate the material and settle

ment record with such a
ricultural resources and techniques but a change in
subsistence data. The
climate is equally important. We should, therefore,
not


A SEM imaging of of a textile impression on a terracotta sherd from Harappa, showing the use of jute fiber in the
sherd from Harappa, showing the use of jute fiber in the

Harappan Civilization (*Wright, R.P.*) L.), Harappan Civilization(*Wright, R.P.*

A recent article by Rita Wright and colleagues

Changes in the Late Harappan Phase:

in
Finds of textiles from eastern Iran published
Although kharif food crops, i.e. millets and rice, are
(16) report evidence for the use of jute fiber, baseda few years ago by Irene Good in *Ancient Textiles:*
not of much importance in the subsistence economy (2003), included aon analysis of fiber impressions preserved on a ter

of Mature Harappan, couple examples of jute, as well as many of sunn
racotta sherd from Harappa. Figure below shows

hemp

,
which were also presumed to have been im
tance for the Late Harappan period, especially in
the details of the impression of the woven fabric as
the peripheral areas of Gujarat and the Divide. Atported from the Indus to the east. Unfortunately as
While archaeobo
issue is how we interrelate the material and settle
tanists had perhaps long suspected the cultivationa small-seeded legume, recognizing the presence
ment record with such a subsistence data. The shift
of jute fiber, which is native to South Asia, in theof sunn hemp in seed assemblages, especially as
toward more localized stylistic attributes and away
Indus Valley, seed finds from sites such as Rojdi
from urban complexes at the end of the third millen
really possible, and could prove intractable. Taken
nium B.C. Is in parallel with a substantial change in
together with evidence for flax seeds, and cot
agricultural regime, especially in the composition ofton in the Indus Valley, as well as wild silk produc
the subsistence base. This change is often de
tion (from the Assam silk moth), reported by Good & (2003), included a
al. (63) **,** the Harappan Civilization was quite the
shift toward more localized stylistic attributes and
expect the cultural diversity of the Late Phase to be
away from urban complexes at the end of the third
mirrored by regionally distinct subsistence systems.
millennium B.C. Is in parallel with a substantial
Steve Weber proposes (54) that what happened in
change in agricultural regime, especially in the
composition of the subsistence base. This changethe peripheral sites was no different from what hapis
often described as being closely associated with,pened in other parts of the Harappan culture area. All areas
or even stimulated by, a revolution in agricultural
were involved in the same long-term
resources and techniques but a change in climate
trends toward more cropping seasons and a broad
is equally important. We should, therefore, expect
plant base that have already been cited.
the cultural diversity of the Late Phase to be mir
Several factors have been invoked to account
rored by regionally distinct subsistence systems;
for the shift from a more integrative and regional

new plants that opened up areas for exploitation system to a more decentralized and localized one.
had muted impact elsewhere. Steve Weber proSome would have others poses (18) that what happened in the peripheralbeen natural events;

would have stemmed from human action. Sedimen

sites was no different from what happened in other
tation and its effect on river inundation more than
parts of the Harappan culture area. All areas were
likely impacted the Ghaggar-Hakara river system.
involved in the same long-term trends toward more
This would obviously have dealt a serious blow to
cropping seasons and a broad plant base that have
already been cited.cultivation and hence food production. In addition to this event, the Indus River appears to have shifted
the subsistence and the sociopolitical system of the
further to the east (51,52)) and there was a possiHarappans. Yet, the agricultural system becameble decrease in the amount of rain occurring in the
more uniform and began to resemble the pattern
summer months. Humans also made their mark on
seen in much of South Asia today, whereas the ma
the environment through herding, deforestation, and
terial culture and settlement systems became more
intensive agriculture. Paleoethnobotanical analysis
localized and less standardized and centralized. In
from sites
this milieu of the Late Harappan agriculture the culthroughout this region clearly shows
changes in vegetation that were the result of human
tivation of millets and rice acquire a particular sigbehavior, for example, a rise in the density and nificance. First, it gives the agriculturists an in
quantity of weedy species (53)). This suggests in
creased security through decreasing the risk of crop
failure: if the
rabi
creased disturbance to the land. Any one of these crop failed for some reason, one

can hope to recover in the next season, i.e.factors, or some in combination, would have disThrough therupted the production and distribution of food, since can be utilized in two alternative ways, thus increasall involved disturbance to the environment. Preing the overall production. Third, a less productivesumably, in response, people moved away from the

land can be utilized for the crop that does not need

large urban centers and into a system of smaller, scribed as being closely associated with, or even much irrigation. For example, the millets wouldmore dispersed settlements. There was also an centre of textile crop diversity in the Bronze Age (compared to apparently only flax cultivation in contemporary Egypt or Mesopotamia). This adds

its

stimulated by, a revolution in agricultural resources and techniques but a change in climate is equally
246 important. We should, therefore, expect the cultural 286diversity of the Late Phase to be mirrored by re

gionally distinct subsistence systems; new plants

Indus people. The beginning of their cultivation

techniques used in the Indus Valley. Perhaps the unlike wheat and barley which are winter grasses. green gram in the summer. Although the emphasis could be grown on marginal lands without a need importance lies in the fact that they are summer

must

Gangetic Divide, and Gujarat. A brief description ofThis factor presumably

have

these crops follows
a

on certain plants changed over time, no plant diseffect on part of the cereal food in the northwestern region

for irrigation, they were important, if not critical,
double-cropping in those areas that unlike wheat and barley which are winter grasses.

had appears from the record, implying that whatever the becomealthough importance lies in the fact that they are summerself-sufficient. and

Ancient Pakistan - An Archaeological History

Millets: aggregate food supply of the Harappans and this This factor presumably

Harappans acquired, they kept in their dietary repcould be grown on marginal lands without a need
generally not need much water and barley could be
ond millennium BC, a number of indigenous cereals
double-cropping in those areas that for irrigation, they were important, if not critical,

factor is bound to have

ertoire, even when they were dispersing into new

a positive effect in

muchsome monsoon rains in summer. Since the millets For
the agricultural system appeared to have become

cultivated on lands which are relatively dry. In this
respect, the cultivation of millets and rice acquired a
considerable importance in the Late Harappan pe

must
and some plants of African origin were brought uncould be grown on marginal lands without a need
areas of inhabitation. This especially applies to the
revolutionary effect on theIndus people. The beginning of their cultivation

providing a food surplus on which the Harappan

for irrigation, they were important, if not critical, could be grown on marginal lands without a need must on certain plants changed over time, no plant dis
millets and rice.
aggregate food supply of the Harappans and this additions to the prehistoric food supply of the the winter and rice, millets, grape, and black, and Both of these crops have drawnaggregate food supply of the Harappans and this
riod, especially in northern Punjab, the
ternatively have been a local domesticate. The first
This trend reflects the fact that once a plant is

Civilization eventually arose. a positive effect in

certain occurrence of this millet in Pakistan is atmust
Gangetic Divide, and Gujarat. A brief description ofertoire, even when they were dispersing into newIndus people. The beginning of their cultivation
Indo
have on certain plants changed over time, no plant dis
added to the core subsistence repertoire, especially
areas of inhabitation. This especially applies to thehada appears from the record, implying that whatever the
providing a food surplus on which the Harappan
ther intensification of the Harappan agriculture in its South ond millennium BC, a number of indigenous cereals
in
marginalPirak, in the early second millennium BC.that abound in Civilization eventually arose. Late phase. environments
During the early second millennium, a numfactor is bound to have
areas of inhabitation. This especially applies to the
Civilization eventually arose.
providing a food surplus on which the Harappan continued cultivation of wheat, barley, and pulses.aggregate food supply of the Harappans and this Civilization eventually arose.
Civilization eventually arose. added to the core subsistence repertoire, especially providing a food surplus on which the Harappan
inLate phase.and might haveenvironmentsCivilization eventually arose.
reached the Indus Civi

Jawar, another African millet, is curlization via their trading
rently prized as a fodder. It has been

outpostan important cereal crop in Punjab up

an important cereal crop in Punjab up which was situated in
to the nineteenth century AD
the region adjacent to
Gangetic Divide, and Gujarat. A brief description of these crops follows

Millets: During the late third and early second millennium BC, a number of indigenous cereals and some plants of African origin were brought under cultivation by the Indus people. These included millets and rice. Both of these crops have drawn much attention due to their potential role in the further intensification of the


Subsistence Economy

remained a significant

tween the third and second millennia B.C., subsis southern Millets are a heterogenous group of small Sometence change was simply a continuation of efforts to

seeded, edible (usually cultivated) grasses, which where broomcorn mil Some

include species in some nine different genera. In theorized that the introduction of


tion systems characterized by low rainfall, low soil fer-

Harappan agriculture in its Late phase.


increase yield in a more agriculturally based society.

Bajra

millets to the Harappan subsistence **tility, and high temperature.** some cases there is more than one species in a tion systems characterized by low rainfall, low soil fer genus. Most millets can, with some degree of cer

Bajra, **or pearl millet, has been the most widely grown** tility, and high temperature.

type of millet in Pakistan. It is well adapted to produc millets to the Harappan subsistence

tion systems characterized by low rainfall, low soil fer- tion systems characterized by low rainfall, low soil fer

tainty, be assigned to their probable geographical

regions of origin, which include Africa, and India.
Within these geographical millet groups no single
diffused package is discernible, so that the history

tion systems characterized by low rainfall, low soil fer*Bajra*, or pearl millet, has been the most widely grownluctant to stop cultivating a useful plant, even if itof the early occurrence of millets on these sites, and of type of millet in Pakistan. It is well adapted to produc

tion of their artifacts and architecture, on the other
tion systems characterized by low rainfall, low soil fer
was being grown in Kutch and southern Sind in the late Early Indus period. On the basis
same broadening and diversifying strategies. Thus,

of each crop in the
Indus Valley must
be traced individu
ally. Unfortunately
it can be difficult to

of the early occurrence of millets on these sites, and of
tion of their artifacts and architecture, on the other
of Shortughai, there is no reason to believe that African millets were introduced late in
same broadening and diversifying strategies. Thus,
Bajra
, or pearl millet, has been the most widely grown
the Harappan sequence and that these crops played no role in the subsistence economy

of the early occurrence of millets on these sites, and of ***Bajra*, or pearl millet, has been the most widely grown type of** of the Harappan Civilization. type of millet in Pakistan. It is well adapted to produc**type of millet in Pakistan. It is well adapted to produc-** was a localization of artifact styles sometime be**millet in Pakistan. It is well adapted to production systems**the Harappan sequence and that these crops played no role in the subsistence economy

tion systems characterized by low rainfall, low soil ferof the Harappan Civilization.
sustain the Harappan Civilization.
let: jowar (sorghum or Guinea corn,creased security through decreasing the risk of crop
characterized by low rainfall, low soil fertility, and high tem*color),*
Agriculture

Harappan Civilization - The material culture
Subsistence Economy!
Harappan Civilization - The material culture
remained a significant !

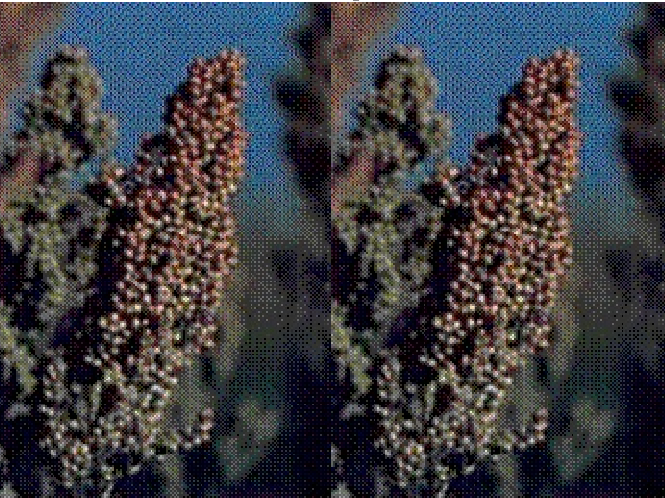
on
both
winter
Subsistence Economy!
and
Alternatively, remained a significant population
led the Harappans to

on Subsistence Economy!
in the next season,received
Alternatively, remained a significant population

led the Harappans to
received
led the Harappans to
the milletsreceivedwould

led the Harappans to
revolutionary effect thereceivedon
Punjab, the Indo

revolutionary
effecteffect the
a positive effect inon the
a positive effect in
a positive effect inrevolutionary effect
that
abound
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in South

a positive effect in
*Jawar,* ***Jawar,*** another African millet, is curthat
abound
in
South
rently prized as a fodder. It has been an important cereal

Jawar, another African millet, is cur**crop in Punjab up to the nineteenth century AD**rently prized as a fodder. It has been ***Jawar,***
rently prized as a fodder. It has been **another African mil**
an important cereal crop in Punjab up

an important cereal crop in Punjab up **another African millet, is cur**another African millet, is cur**rently prized as a fodder. It has been an important cereal** regions of origin, which include Africa, and India.

Jawar,
tween the third and second millennia B.C., subsisWithin these geographical millet groups no single

rently prized as a fodder. It has been
Some

fodder. It has been an impor
tence change was simply a continuation of efforts to
diffused package is discernible, so that the history
increase yield in a more agriculturally based society.

Some of each crop in the Indus Valley must be traced intheorized that the introduction ofEnvironmental shifts were impacting both the dividually. Unfortunately it can be difficult to distinmillets to the Harappan subsistence subsistence and the sociopolitical system of the

guish native South Asian species from sister speeconomySomecies originating in East Asia. Since reliable and than the earlymore uniform and began to resemble the pattern

economytheorized that the introduction of seen in much of South Asia today, whereas the ma
the range of millets potentially encountered in South period. If it were so, they contend,terial culture and settlement systems became moreAsian archaeobotany is not available, publishedthan the early millets to the Harappan subsistence Harappans. Yet, the agricultural system becamethen these crops could not havemore uniform and began to resemble the pattern

distinguish native*Bajra*, or pearl millet, has been the most widely grownarchaeological evidence only in the

South Asianspeand ragi (finger millet, cies
from
sister

type of millet in Pakistan. It is well adapted to producLate Harappan period but sustain the Harappan Civilization. ber of plants of African origin appeared in GujuratMillets are a heterogenous group of smallcrops are not local domesticates, nor are they of *kharif*species originating intion systems characterized by low rainfall, low soil ferthe

was being grown in Kutch and southern Sind in the late Early Indus period. On the basisWest Asian origin as barley and wheat may have

ized in two alternative ways, thus increasing theIt is true that

East Asia. Since re
seeded, edible (usually cultivated) grasses, whichcrops
luctant to stop cultivating a useful plant, even if it *Panicum*
liable and generally
include species in some nine different genera. In of the early occurrence of millets on these sites, and of
was less important to them over time. In the producoverall production. Third, a less productive land can
accepted criteria for
some cases there is more than one species in a

tion of their artifacts and architecture, on the other *Sorghum bi*genus. Most millets can, with some degree of cer hand, people obviously did not demonstrate the

archaeological evidence only in theof Shortughai, there is no reason to believe that African millets were introduced late in

through eastern Iran during the late Early Harappan

irrigation. For example, the millets would generally Late Harappan period but

period in the fourth millennium BC or through Oman
the identification of
the range of millets

potentially encounsame broadening and diversifying strategies. Thus,was being grown in Kutch and southern Sind in the late Early Indus period. On the basisnot need much water and barley could be cultivatedof the Harappan Civilization.

contributed
localized and less standardized and centralized. In
period. If it were so, they contend,
this milieu of the Late Harappan agriculture the culin Gujarat, and present at Harappa around 3000period. If it were so, they contend,
sustain the Harappan Civilization. localized and less standardized and centralized. In
contributed
Mature Harappan known in the LateIt is true that contributed creation creased security through decreasing the risk of crop *(Setaria italica)*,*jwar* and
which Harappan period, is thought possibly to be a localsurplus failure: if thesurplus archaeological evidence only in the known in the Late Harappan period, is thought possibly to be a local domesticate but was more probacan hope to recover in the next season, i.e. throughLate Harappan period but to the crops. Second, the same land can be utilofin
It is true that contributed *bajra* *jwar*was andized in two alternative ways, thus increasing thedomesticate but was more probably introduced. It
archaeological evidence only in the
creation
It is true that
millet in the early leveloverall production. Third, a less productive land can which needed to
*Panicum*lennium BC, and was being grown as far west as was a major crop in China, having been broughtLate Harappan period but
sustain the Harappan Civilization. crops. Second, the same land can be utillennium. Broomcorn (or common) milletirrigation. For example, the millets would generally was being grown in Kutch and southern Sind in the late Early Indus period. On the basis
under cultivation in the seventh millennium BC, and .
In
Panicum
overall production. Third, a less productive land can
on lands which are relatively dry. In this circumwas being grown as far west as Tepe Gaz Tavila inin southern Central Asia (as well as in China) and
might have reached the Indus Civilization via their
irrigation. For example, the millets would generally of Shortughai, there is no reason to believe that African millets were introduced late in southeast Iran by the sixth millennium. Broomcornwas being grown in Kutch and southern Sind in the late Early

Indus period. On the basis Page 446 the Harappan sequence and that these crops played no role in the subsistence economy of Shortughai, there is no reason to believe that African millets were introduced late in the Harappan sequence and that these crops played no role in the subsistence economy Page 446

trading outpost at Shortugai, which was situated in riod, not need much water and barley could be cultivated especially Indo the region adjacent to southern Turkmenia, where on lands which are relatively dry. In this circum in northern Punjab, the (or common) millet in the early level *(Panicum miliaceum)* was considerable importance in the Late Harappan pe 268 probably brought under cultivation in southern Cen 287 tral Asia (as well as in China) and might have 287 reached the Indus Civilization via their trading out Page 446 post at Shortugai, which was situated in the region Page 446 247 crops are not local domesticates, nor are they of on lands which are relatively dry. In this circum

of the early occurrence of millets on these sites, and of stance, the cultivation of millets and rice acquired a tered in South Asian while it may be true that large city complexes gave

West Asian origin as barley and wheat may have
way to smaller farming settlements, and that there considerable importance in the Late Harappan pe archaeobotany is not available,
published
was a localization of artifact styles sometime be

of Shortughai, there is no reason to believe that African millets were introduced late in riod,

reports are
vague.
Little millet
most likely introduced to the Indus farmers either Page 446 268

the Harappan sequence and that these crops played no role in the subsistence economy

through eastern Iran during the late Early Harappan

of the Harappan Civilization. period in the fourth millennium BC or through Oman

cum sumatrense) was
common at Mature
Harappan Rojdi, Oriyo
Timbo, and Babar Kot
during the early Mature Harappan period in the 287 early third millennium BC. There is some archaeo

logical evidence of millet cultivation, or at least its wild existence, at Shahr-e-Sokhta in eastern Iran in the Early Harappan period but there is no clear evidence of their existence in this period at any place

in the Greater Indus Valley. This shows that these

crops may have not ‘diffused’ into Baluchistan, and subsequently into Sind and Gujarat, through land routes. The acquisition of these crops through indirect maritime contacts with East Africa, probably through Oman, is more likely.

Although the evidence is very uncertain, it is possible that some African crops were under cultivation in Oman (ancient Magan) during the third millennium, and sorghum and another African millet may also have been cultivated in Yemen at this time, though the identification is not certain. These plants are assumed to have spread due to contacts across the Red Sea between southwest Arabia and East Africa, regions between which there were close communications in later times. Unfortunately the third-millennium archaeology of both areas is poorly known, and the earliest record of these crops in Africa greatly postdates their appearance elsewhere, although there is much earlier evidence of their exploitation as wild plants. It is also possible that some of these plants were part of the original flora of Yemen and were taken into cultivation there. From southwest Arabia the domestic plants proba- bly spread via local exchange networks through the southern coastal region of Arabia as far as Oman. Alternatively, the crops may have been carried as provisions by seafarers plying the sea lanes of this coast, who on their return home handed over the residue as novelties that were used in experiments. If these commodities were carried by organized sea traders, the latter may have come most likely from Oman rather than Yemen.

Oman is known to have substantial trade and exchange contacts with east Africa, if not directly then through some third, fourth, and fifth parties. The appearance of these plants in Sindh and Gujarat coincides with the beginning, or at least the expansion, of significant maritime activities of the Harappans in the Persian Gulf. Possehl proposed that an extension of the marine activity took Indus sailors at least as far as the southern end of the Red Sea and possibly farther south along the east coast of Africa and it is in this environment that they came in contact with the millets, integrated them into their food supply, and eventually carried them back home to the Indus Valley (19). This scenario is quite tantalizing but on closer examination does not seem to be likely. If the Harappans did acquire millets from East Africa, they probably did it indirectly through the people of Oman, across the Makran coast, as described above. The Harappans did not have to sail all the way to East Africa to be able to be acquainted with these crops.

African millets are not important in the current agricultural economy of Pakistan although *Bajra* and *jwar* remained a significant part of the cereal food in the northwestern region of Pakistan till very recent times. Their historical importance lies in the fact that they are summer crops that prosper during the summer rains, unlike wheat and barley which are winter grasses. This factor presumably led the Harappans to double-cropping in those areas that received some monsoon rains in summer. Since the millets could be grown on marginal lands without a need for irrigation, and since they are drought resistant plants, they were important, if not critical, additions to the prehistoric food supply of the Indus people. *Bajra*, or pearl millet, has been the most widely grown type of millet in Pakistan. It is well adapted to production systems characterized by low rainfall, low soil fertility, and high temperatures.

Some archaeologists have earlier theorized the introduction of the millet cultivation in the Indus time, though the identification is not certain. These plants are assumed to have spread due to contacts across

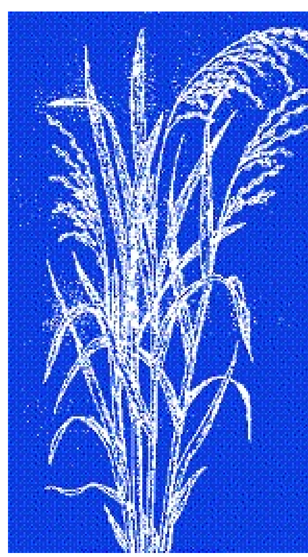
the Red Sea between southwest Arabia and

Harappan Civilization - The Material CultureEast Africa, regions between which there were close communications in later times. Unfortunately

Valley must have had a revolutionary effect on the the third-millennium archaeology of both areas is aggregate food supply of the Hardpans, providing a
poorly known, and the earliest record of these crops
food surplus on which the Harappan Civilization
in Africa greatly postdates their appearance elseeventually arose. This is, however, not true. The where, although there is much earlier evidence of
introduction of millets and rice to the Harappan subtheir exploitation as wild plants. It is also possible sistence economy date quite a bit later in the Mathat some of these plants were part of the original ture Harappan period. If it were so, then these crops
flora of the Yemen and were taken into cultivation
could not have contributed to the creation of surplus

on
there. From southwest Arabia the domestic plants which
probably
have thespreadHarappanlocalCivilization could via exchange networks
248
arisen. There is also no reason to believe thatthrough the southern coastal region of Arabia as far these crops even played any significant role in the
as Oman. Alternatively, the crops may have been
sustenance of the Harappan Civilization.
carried as provisions by seafarers plying the sea!*Rice:* Rice is also an importantSubsistence Economy
lanes of this coast, who on their
Kharif

return crop. It is indigenous to economy dated quite a bit later than the early Mature Harappan period. If it were so, they contend, then these crops could not have contributed to the creation of surplus which was needed to sustain the Harappan Civilization. It is true that are in archaeological evidence only in the Late Harappan period but and southern Sindh in the late Early Harappan period. On the basis of the early occurrence of millets on these sites, and of level of Shortughai, there is no reason to believe that African Harappan sequence and that these crops played no role in the subsistence economy of the Harappan Civilization. RICE: Rice is also an important indigenous to parts of South and East Asia, including the Indus region and the Ganges Valley. The



history of its cultivation is complex and probably **Rice:** residue as novelties that were Rice grains have been recovered from Lothal in Gujarat but it is
including the Indus region and involved a number of different centers of domestica not known if this rice actually belonged to the Harappan period of
used in experiments.
occupation. Furthermore, it is not established whether the rice inmillet
tion. Genetic evidence has recently established that common) rice was brought into cultivation in at least two
of its cultivation is complex and
(Panicum miliaceum) question is of the wild or domesticated variety. Similarly, rice's presence
probably involved a number of
bly brought under cultivation in rice in East Asia produced the short-grained at Harappa during the Mature period of the Indus civilization is proven
southern Central Asia (as well as
in archaeological records but uncertainty prevails about the cultivated*ica* variety whereas
domestication, probably in sev
tion. Genetic evidence has re
in China) and might have reached eral regions of South Asia, of an annual wild rice
nature of the find. One cannot, therefore, confidently count rice among
the Harappan Civilization via their gave rise to the long-grained trading outpost at Shortugai,the
crops raised by the Indus people. From their wide distribution and the
two separate areas: domestica also spread through Southeast Asia and China.
large quantities in which their seeds have been found, wheat and barley
which was situated in the region Rice cultivation began in the middle Ganges
appear to have been the main food crops of the Indus basin and millets East Asia produced the short where broomcorn millet was an important crop. A formed the main food crops in Gujarat, Sind, and the northern Punjab.
grained domestication,wild ancestor of broomcorn millet exists in South
later in eastern India. The cultures of growing rice in Southeast Asia had close connections with the in
rd probably in several regions of South Asia, of an an
Asia, so it may alternatively have been a local do millennium BC, rice was definitely being grown in
the Swat regionhabitants of eastern India, Bangladesh, and inter
nual wild rice gave rise to the long-grained *indica*
mesticate. Several species of but it was at best at the tail end of the Harappan Civilization. It is not clear yet how rice

variety, which also spread through Southeast Asia
sent at Rojdi, and it is possible that broomcorn milsuch as cord-marked pottery and distinctive shoulwas introduced to this region and what prompted the Indus people of this region to

and China. let was among them. The first certain occurrence of dered axes. This gave rise to speculations that the cultivate this crop. One theory is that the Indus people received rice from China through this millet in South Asia is at Pirak, in the early seccultivation of rice in the subcontinent may have dif

ond millennium.
the Pamir or Hindu Kush passes. Since the Swat region lies at the southern end of this
region during the third millennium and somewhat fused from East Asia.later in eastern India. The cultures of growing rice intraffic, this theory seems to carry considerable weight. Another theory, popular among African millets are not important in the current
Southeast Asia had close cultural connections with Rice grew wild in Gujarat. Charred rice huskssome Indian scholars such as Vishnu-Mitre, is that rice was introduced to the Indus
agricultural economy of Pakistan although *Bajra* and impressions of rice husks and leaves in Harap
andValley from the Ganges Valley during or even prior to the Harappan period. According intervening regions, indicated by sharedartifact
types such as cord-marked pottery and distinctiveto this hypothesis, rice was indigenous to central and lower reaches of the Ganges recent times. Their historical importance lies in the Miller (5), who has established that they are unlikely Valley where it was domesticated. In this connection, a fantastic timeline of the 7th

shouldered axes. fact that they are summer crops that prosper during to reflect rice cultivation. Instead it is probable that Rice grew wild in Gujarat. Charred rice husksmillennium BC is offered. We know, however, that the introduction of agriculture is the summer rains, unlike wheat and barley which rice was among the wild plants consumed by graz

and impressions of rice husks and leaves in Harapvery late in India and in view of this proven timeline, the rice cultivation the Gasngetic
are winter grasses. This factor presumably led the ing cattle resulting in rice husks being present in pan pottery have been found in this region, at Lothal
Harappans to double-cropping in those areas that
plains could not have happened prior to the second millennium BC. If rice is indicated
their dung, which was used for fuel and a tempering and Rangpur. These have been studied by Naomi received some monsoon rains in summer. Since the
in any archaeological remains there, it must be at best a wild, non-cultivated variety.
agent in pottery. Rice husks and phytoliths have
Miller (20), who has established that they are unmillets could be grown on marginal lands without aAnother theory is that rice came to India from China through its eastern regions, where likely to reflect rice cultivation in this rtegion. Insteadneed for irrigation, they were important, if not critiRice, probablyits cultivation is proven in the 4th century BC In this case, rice could have been

it is probable that rice was among the wild plants cal, additions to the prehistoric food supply of the Harappan in the Divide. By the early second millenintroduced to the Indus people through a diffusion process from northern India or from Indus people. The beginning of theirconsumed by grazing cattle resulting in rice husks cultivation nium, however, rice was certainly being grown in must have had a revolutionary

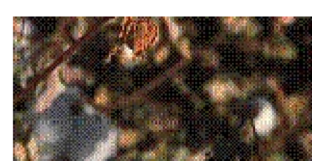
effect on the aggreGujarat, probably during the Harappan Civilization itself. Or somewhat later.

being present in their dung, which was used for fuel the eastern Indus region. It was among the cultiand a tempering agent in pottery. Rice husks and gate food supply of the Harappans and this factor is Charred cotton seeds have been found at Mehrgarh, dating vated plants at the Late Harappan site of Hulas,
phytoliths have also been found in pottery and

bound to have a positive effect in providing a foodwhere both wild and cultivated bricks at Harappa. Rice, probably wild, is known prior to 5,000 BC. These are indeed the earliest samples found so surplus on which the Harappan Civilization eventuidentified.
ally arose.

from Early Harappan in the Indo-Gangetic Divide.far anywhere in the world Whether these seeds came from a
Bajra, or pearl millet, has been the most *Japonica*
By the early second millennium, however, rice was cultivated variety or from the cotton that was gathered in the wild, Valley by the sixth millennium BC, and its cultivationcertainly being grown in the eastern Indus region. It
adapted to production systems characterized by lownot known. There is good evidence of the use ofspread from there to other parts of China and was among the cultivated plants at the Late Harapcotton cloth at Mohenjodaro as well as at Harappa, c. 2500 BC. probably in Southeast Asia. From northern China,pan site of Hulas, where both wild and cultivated
Gossypium-type pollen has been found at Balakot. This sample *indica* rice were identified.came from layer IV, which places it rather late in the Mature*Japonica* rice was grown in China's Yangtze

Valley by the sixth millennium BC, and its cultivation Harappan sequence, somewhere around 2000 BC. McKean argues spread from there to other parts of China andas effectively as she can that this pollen resulted from cultivated



probably in Southeast Asia. From northern China, cotton. A single carbonized cottonseed was also found at Hulas; it

rice cultivation spread to Manchuria and Korea. It

also belongs to the Late Harappan or Pos-urban Phase. Thus, archaeological data do not offer us any certainty of cotton cultivation in the Early Indus or Mature Indus periods, although its presence and use is in evidence as far back as 5,000 BC.

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was possibly from China that rice cultivation reached Kashmir, a region that had a number of links with China: Rice began to be grown at Gufkral in Kashmir during the first half of the second millennium. Rice, apparently *japonica*, was the principal crop of the settlement at Pirak in the Kachi

plain, an arid region where irrigation would have been required.

The earliest evidence for cultivated rice in ancient Pakistan comes from Swat (10). It was definitely being grown there by the end of the 3rd millennium BC, the tail end of the Harappan Civilization. It is not clear yet how rice was introduced to this region and what prompted the Indus people of this region to cultivate this crop. One theory is that the Indus people received rice from China through the Pamir or the Hindu Kush passes. Since the Swat region lies at the southern end of this traffic, this theory seems to carry considerable weight.



A Punjabi farming family carry bundles of paddy from a rice field in an age-old fashion

Another theory, popular among some Indian scholars such as Vishnu-Mitre, is that rice was introduced to the Greater Indus Valley from the Ganges Valley during or even prior to the Harappan period. According to this hypothesis, rice was indigenous to central and lower reaches of the Ganges Valley where it was domesticated. In this connection, a fantastic timeline of the 7th millennium BC is offered. We know, however, that the introduction of agriculture is very late in the GangaJamuna plains and in view of this proven timeline, the rice cultivation in the Gangetic plains could not have happened prior to the second millennium BC. If rice is indicated in any archaeological remains there, it must be at best a wild, non-cultivated variety. Another theory is that rice came to India from China through its eastern regions, where its cultivation is proven in the 4th century BC In this case, rice could have been introduced to the Indus people through a diffusion process from northern India or from Gujarat, probably during the Harappan Civilization itself.

The presence or absence of rice from Harappan agriculture has long been an issue of controversy. While there is growing evidence for the cultivation of rice during the Late Harappan phase in various regions of Pakistan, there is no reason as yet to believe that it was an important crop for the Harappan Civilization during its Mature phase. Rice phytoliths have been reported from Harappa (21). The macrobotanical remains also indicate rice at Harappa but only in the later urban period, after *ca.* 2200 BC (22). This evidence suggests that rice was available as a crop for the Harappan cities and towns of the Harappan region but not widely adopted. That rice does not feature in the agriculture, as it is presently understood, of the core regions of the Indus during the early Mature phase, (2600-2300 BC) indicates that there must have existed aspects of the agricultural traditions and organization of Harappan Civilization which prevented the adoption of rice. Systems of irrigation, tillage and seasonal labor scheduling could all have operated against the spread of rice. Or less tangible cultural food values may have been involved. As previously discussed, regions along the northern Indus

Basin, such as the Gomal and Swat Valleys, appear not to have participated in the urbanization and interaction systems that characterized the Mature Harappan Civilization despite the presence of Early Harappan sites in these areas. One of the contributing factors of this could have been that the rest of the Indus system, where the Harappan Civilization was established, shared in separate developments of agricultural production (23).

Pulses of Indigenous Origin: Pulses are presently an important segment of crop agriculture in Pakistan as well as in India. South Asia had a number of native pulses that were locally domesticated. These included green gram *(Vigna radiata)* and black gram *(Vigna mungo)*, which were grown at a number of Late Harappan sites. Horse gram *(Macrotyloma uniflorum)* was domesticated in

South India during the same period and is known from Late Harappan sites in Gujarat. During the early second millennium, two further pulses, of African origin, were added: hyacinth bean *(Lablab purpureus)* and cowpea *(Vigna unguiculata)*, the latter being grown in Gujarat and both appearing in South India after 1800 BC.

It seems that all these varieties of pulse were more important in peripheral regions of the Harappan Civilization, particularly in Gujarat, than in the Indus heartland.

Irrigation: One of the unresolved issues regarding the Harappan subsistence economy is irrigation. Direct evidence for irrigated cultivation is scarce but there are some related things that are known from the Early Harappan period. At Mehrgarh, the charred seeds of wheat and barley were found which grow only on irrigated fields. There were three different forms of irrigation in these areas. The first used the natural flooding of a hill stream to irrigate land. The second form, documented at the site of Kali Buthi, made use of small, shallow ditches to gently guide spring water out The Neighborhood Harappan Civilization - The Material Culture

onto a flat area that was used for cultivation. The
during the inundation, and the retreating floodwa
third irrigation practice used by the Sindhis as well
ters left fertile ground highly suitable for cultivation: **Irrigation:** One of the unresolved issues re
cultivation
Today this is around 8,000 hectares in extent. Thegarding the Harappan subsistence economy is irrias
southern Baluchis involved checkdams, either as low, linear mounds of earth across broad fields
winter crops were also sustained by the water regation. Direct evidence for irrigated cultivation is calledtained in
streams, channels, lakes, and dhands or as larger stone structures along
scarce but there are some related things that are

one of its natural flood channels, and reaped in March or April. In modem practice such land is neither ploughed nor manured, nor does it require additional water. Lambrick remarks that 'the whole operation involves an absolute minimum of skill,

labor and aid of implements'. The active flood plain streams, called from the *gabarbands*.(seasonal lakes), supplemented by water brought
known down in January or February by the Early Harappan period. At
such irrigation structures were found in southern
Mehrgarh, the charred seeds of wheat and barley

theBaluchistan, southwestern Sindh, and Sindhi Kohisof The margins
Subsistence Economy !
of the rivers provided excellent arable land, its fertil
ity renewed annually by the silts deposited by the dhandswere found which grow only on irrigated fields. The

tan belonging to the Early Harappan period.and oxbow lakes, the latter formed be far-fetched to visualize the existence of small man-made ponds on the peripheries of

abandoned meanders of the Indus, allowed cultivaremains of several irrigation structures were foundfloodwaters, the coarse sediments closest to the

in southern Baluchistan, southwestern Sind, andagricultural settlements for watering of their cattle, goats and sheep, just as it isriver being richest in nutrients. Patches of deeper

Sindhi Kohistan belonging to the Early Harappan
tion from year to year.were able to dig ditches to drain swamps and move sediment reflected the unpredictable distribution of small amounts of water to and from their fields, but

commonly done in rural Pakistan of to-day. Wells may have been used for irrigation

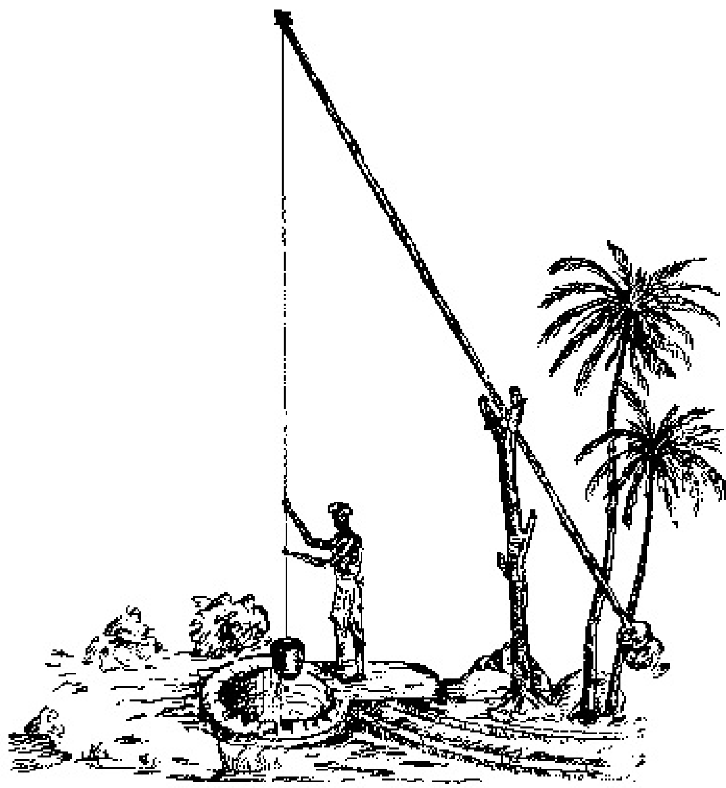
channels cut by the river's floodwaters: these had to

near small settlements such as at Allahdino

be searched for, but they provided the best agricul

or for watering gardens within the city. tural land, cultivable without plowing. In western

Sindh, Lake Manchar flooded an enormous area



Shaduf is probably the simplest and the most efficient arrangement for lifting water from shallow wells. These contraptions have been in use for irrigation purposes
contraptions have been in use for irrigation purposes all personal **allover Pakistan for the centuries past. It is assumed,**
most efficient arrangement for lifting water
although without any hard evidence, that the Harappan
also used these mechanical devices. also used these mechanical devices.
from shallow wells. These contraptions have *rabi*
)
been in use for irrigation purposes all over
Farther north in the Punjab, farming was period. There were three different forms of irrigation
rather the bigger problem of moving water from the
confined to the alluvial soils in the valleys, annually
active river courses to the land that would not have

flooded by the five rivers, with large areas of uncula hill stream to irrigate land. The second form,that the Harappan also used these mechanitivated higher ground between them. This region documented at the site of Kali Buthi, made use of been flooded naturally. It has to do with the question

was of the Indus population's capacity to gather and
received monsoon rain in the summer, and some
small, shallow ditches to gently guide spring water
widely
winter rainfall, particularly in the western portion. out onto a flat area that was used for cultivation. manage large labor force, as well as the salination of agricultural fields with its consequent drop in proThe area southeast of the Punjab, the eastern part

Archaeological
circumstantial, civilization is the first culture known where Today this is around 8,000 hectares in extent. The

winter crops were also sustained by the water re

access to underground water was secured by

tained in streams, channels, lakes, and dhands

wells. One need not doubt that *'cutcha'* wells
down in January or February by the *nais* flowing off were dug in the villages; and at Allahdino

the mountains of Baluchistan. The margins of

dhands and oxbow lakes, the latter(near Karachi) a stone-masonry well, built on by higher ground, was so placed as to irrigate formed

abandoned meanders of the Indus, allowed cultiva

tion from year to year.lower level fields. How the Harappans drew

Farther north in the Punjab, farming was

water out of the wells, is not known. There is

confined to the alluvial soils in the valleys, annually

no proof that the pulley was in use, andflooded by the five rivers, with large areas of uncul

tivated higher ground between them. This region

without pulley-and-rope the oxen could not

received monsoon rain in the summer, and some

have been used to lift water for field

winter rainfall, particularly in the western portion.

irrigation. The area southeast of the Punjab, the eastern part

of the Ghaggar-Hakra system, is prime agricultural

The Indus people probably used shadufs toland well watered by numerous seasonal water

courses and by heavy summer monsoon rains. Al

raise water from the stream and channels -

though today the numerous rivers and streams

one piece of Indus pottery bears a scratched

carry only seasonal flow in their upper reaches and

picture of a shaduf. A simple T-shaped are dry farther west, in the Indus period this river

system carried far more water and flowed at least to

device consisting of an upright and a

the Fort Derawar area in Cholistan, if not beyond.

horizontal pole with a bucket on one side and

Dense settlement along branches of these river

a counterweight on the other, the shaduf is braids indicates that it was quite productive regions

of the Harappan realms and underlines the signifi

known to have been used in Mesopotamia

cance of the progressive reduction in the volume of

around the time of the Indus Civilization and

water carried by the Ghaggar-Hakra system in the

was later introduced to Egypt. As far as the Late Harappan period. Agriculture was supported by

the floodwaters of the rivers, with their burden of

use of a Persian wheel is concerned, it seems

alluvium; since the rivers were fed by water from the

The third irrigation practice used by the Sindhis as to be non-existent: a Persian wheel requires a large diameter well and no example ofductivity. Aof the Ghaggar-Hakra system, is prime agriculturalbrief answer is that unlike the situation Siwaliks rather than the Himalayas, the volume of

well as southern Baluchis involved ckeck dams,
in the mountains and foothills of Baluchistan, there

either as low, linear mounds of earth across broadsuch a well has been found. The Indus wells were rather narrow. water they carried was considerably less than that

in the Indus and its tributaries, with proportionally
less violent floods. In Cholistan, water for agricul
courses and by heavy summer monsoon rains. Al
is little evidence that major irrigation works werefields called *bunds* numerous
though today theused or required over most of the Indus region.rivers and streams
along streams, called
gabarbands.
carry only seasonal flow in their upper reaches and

or as larger stone structures Lambrick, from his intimate personal knowledge of Sind, has been able to suggest the

The question is not whether the HarappansGroundwater, rivers, lakes, streams, and especially ture could also be obtained from shallow wells tapfloodwaters sufficed.

are dry farther west, in the Indus period this river way in which water has been managed to grow the various crops. The principal food

were able to dig ditches to drain swamps and move
ping the high water table of the river valleys, and

rabi
grains (wheat and barley), would have been grown as spring ( ) crops, sown at thethe Fort Derawar area in Cholistan, if not beyond.small amounts of water to and from their fields, but there was also some summer and winter rainfall.

scheduling

knowledge of Sindh, has been able to suggest the Complexirrigationsystemshavebeen

Dense settlement along branches of these river end of the inundation upon land which had been submerged by spill from the river or way in which water has been managed to grow the
active river courses to the land that would not have sought, but it seems likely that none were required,braids indicates that it was quite productive regions one of its natural flood channels, and reaped in March or April. In modem practice suchvarious crops. The principal food grains (wheat andagricultural settlement being confined to the riverine
barley), would have been grown as spring (land is neither ploughed nor manured, nor does it require additional water. Lambrickenvironments where simple means of water provi

crops, sown at the end of the inundation upon land
sion were adequate, in contrast with the highlands

remarks that 'the whole operation involves an absolute minimum of skill, labor and aid
271which had been submerged by spill from the river or where water conservation was essential. In someof implements'. Cotton and sesame seed would be sown as autumnal (*kharif*) crops:290 they would be sown at the beginning of the inundation and harvested at its close, in the autumn. For this, fields surrounded by earth embankments would be required, most probably along the banks of natural flood channels. Although this method is more
evidence,
although
during the inundation, and the retreating floodwais there. ters left fertile ground highly suitable for cultivation:The Indus

parts of the Indus realms, particularly Sindh, small channels were probably dug to bring water from dhands or streams into fields and to carry away excess water from swampy areas. Neither irrigation nor drainage channels have been located, but this does not mean that they did not exist. The annual deposition of alluvium filled in many irregularities of the plain's surface, which would have included artificial channels, and the unpredictable distribution of the inundation waters meant that the location of fields would often have changed. These factors mean that new channels would have had to be dug each year, rather than cleaning out old ones, and would have made it inappropriate to invest effort in constructing major irrigation canals. Any surviving traces of such channels must by now be deeply buried beneath four millennia's alluvium.

Most Harappan farming settlements in Gujarat were located in Kutch and Saurashtra. In the

soils in other parts of Saurashtra, where
Subsistence Economy

kharif should, however, be noted how risky this cultivation crops could be raised, watered by rainfall brought

which for some months acted as reservoirs from
method might be, since there is always the possibil
Mature Harappan period, these were confined to by the summer monsoon. The number of settle which to draw
water to irrigate the crops; many held ity of water overtopping the bund an destroying the locations along the rivers and streams, and particu
ments in the region expanded at least fourfold in mean that new channels would have had to be dugfields. Nonetheless, this type of water trapping is
this period. Kutch, to the northwest of Saurashtra, water until December and some as late as Febru still used in some of the Thal area (in Punjab) along
Late Harappan period. Agriculture was supported by
larly
along
the
Nal
Depression,
which
retained
was an island in the Harappan period. Today the would have made it inappropriate to invest effort in brackish subsoil water and poor
rainfall provide little ary. The Indus people probably used lifting gear Wells could also provide ample water for
floodwater through the winter months. Only in the
alluvium; since the rivers were fed by water from the Subsistence Economy to raise irrigation water from support for arable agriculture,
but in the Harappan growing crops. In fact, the Indus Civilization is the
times, when a considerable flow of river water en
shaduf buried beneath four millennia's alluvium. first culture known where access to underground
Late
Harappan
period
did
farming
settlements
tered
Most Harappan farming settlements in Gu
the

Ranns,
which grow only on irrigated fields. The remains of several irrigation structures were

these and from streams and channels. One sherd of water was secured by wells. Drawing water from found in southern
Baluchistan, southwestern Sind, and Sindhi Kohistan belonging to the them would have been a labor-intensive activity,
spread onto the moisture retentive, black cotton irrigation by digging wells. Indus pottery from Mohenjo-daro bears a scratched
requiring considerable animal power, though in ar
soils in other parts of Saurashtra, where *kharif* In the Harappan agricultural economy there is Early Indus period.
There were three different forms of irrigation in these areas. The eas subject to summer flooding only shallow wells

crops could be raised, watered by rainfall brought
also evidence for some kharif (summer) crop pro
first used the natural flooding of a hill stream to irrigate land. The second form, retained

were needed to reach the high water table. A maduction. Once more there is no need to infer the floodwater through the winter months. Only in the Complexirrigationsystemshavebeen

documented at the site of Kali Buthi, made use of small, shallow ditches to gently guide may have settlements by the summer monsoon. The number of settle
presence of complex architectural structures despring water out onto a flat area that was used for cultivation. The third irrigation been used for irrigation: It was situated on higher a bucket on one side and a counterweight on theground, from which the water could run down to theagricultural settlement being confined to the riverinepractice used by the Sindhis involved ckeck dams, either as low, linear mounds of earth *kharif*ments in the region expanded at least fourfold inticed, until very recently, without the need of canal crops could be raised, watered by rainfall broughtfields. The fine examples of wells in Indus towns
this period. Kutch, to the northwest of Saurash
across broad fields called
bunds
or as larger stone structures along streams, calledshow the high level of Harappan competence in by the summer monsoon. The number of settle
where water conservation was essential. In some
gabarbands.
The
mally near the Indus or one of the old inundation are proper dams made of stone and built about half wayconstructing them. In the central region, Sindh, the *gabarbands*
ments in the region expanded at least fourfold in

tra, was an island in the Harappan period. Today the brackish subsoil water and poor rainfall provide little support for arable agriculture, but in the Harappan times, when a considerable flow of river water entered the Ranns, the underground water was probably sweet and could have been accessed for irrigation by digging wells.

In the Harappan agricultural economy there is evidence for some kharif (summer) crop production. Once more there is no need to infer the presence of complex architectural structures devoted to irrigation, as kharif cultivation was still practiced, until very recently, without the need of canal irrigation systems. The chosen piece of land, normally near the Indus or one of the old inundation canals, was surrounded with an earth embankment with an opening to admit the flood water as soon as the first spill occurred. Then the opening is blocked, trapping the water in the trapping is still used in some of the Thal area (in Punjab) along the Indus river.

Wells could also provide ample water for growing crops. In fact, the Indus Civilization is the first culture known where access to underground water was secured by wells. Drawing water from them would have been a labor-intensive activity, requiring considerable animal power, though in areas subject to summer flooding only shallow wells were needed to reach the high water table. A masonry well at Allahdino, near Karachi, may have been used for irrigation: It was situated on higher ground, from which the water could run down to the fields. The fine examples of wells in Indus towns show the high level of Harappan competence in constructing them. In the central region, Sindh, the Indus-Ganges

doab, and perhaps the western Hakra, the floods filled numerous hollows (dhands),


Diwana dam from the Early Indus era in**Diwana dam from the Early Indus era in southern Baluchistan (after Fairservis)**southern Baluchistan (after Fairservis)

Diwana dam from the Early Indus era in southern Baluchistan (*after*

parts of the Indus realms, particularly Sindh, small
canals, was surrounded with an earth embankment
channels were probably dug to bring water from

with an opening to admit the flood water as soon as
this period. Kutch, to the northwest of Saurashtra,
across hill torrents and small rivers. They are designed to capture both soil and water. It western was an island in the Harappan period. Today the is, thus, logical to think that the Harappans knew the technology of bund constructionHakra, the floods filled numerous hollows (dhands), the first spill occurred. Then the opening is blocked, brackish subsoil water and poor rainfall provide little which for some months acted as reservoirs from cess water from swampy areas. Neither irrigationand the value of non-canal type irrigation system, practiced in past generations. support for arable agriculture, but in the Harappan trapping the water in the field, and the land is
nor drainage channels have been located, but this
times, when a considerable flow of river water enwhich to draw water to irrigate the crops; many held water until December and some as late as Februwas field, and the land is ploughed and sown. While thedoes not mean that they did not exist. The annual tered
As far as the canal irrigation is concerned, the general consensus is that the Indus people ues, potentially damaging water is kept outside by ary. The Indus people probably used lifting gear
inundation continues, potentially damaging water is
the earth bunds and let in only when needed. The
probably sweet and could have been accessed for
structures known as
did not have much of it, if at all. This is, however, not the final word since a canal built to raise irrigation water from
the plain's surface, which would have included artiirrigation by digging wells. which have at
best areas for kharif cultivation are the ones in the these and from streams and channels. One sherd ofkept outside by the earth bunds and let in only whenvicinity of regular flood channels where the farmers attentionby Indus people has been traced near Shortughai, drawing water from Kokcha river. A
the inundation waters meant that the location of
of
Indus pottery from Mohenjo-daro bears a scratched evidence for some kharif (summer) crop production.
greater control over the water. Itcanal is sometimes inferred at Mohenjodaro. There is, therefore, some likelihood that picture of such a device, a simple T-shaped arOnce more there is no need to infer the presence ofneeded. The best areas for kharif cultivation are thecan exercisefields would often have changed. These factors
similar canals were excavated in the Indus basin. dam-like structures observed in Balu
ones in the vicinity of regular flood channels where

chistan and south-western Sindh and assumed to
At the site of Mohenjodaro they built a large water tank as a reservoir for the city and a
the farmers can exercise greater control over the
be built to store water from seasonal streams, can

similar tank may have existed in the center of ancient Harappa. The existence of such water. It should, however, be noted how risky this effectively trap water runoff, slowing water speed large reservoirs for agricultural purposes is not in evidence anywhere but it would not
cultivation method might be, since there is always
the possibility of water overtopping the bund an destroying the fields. Nonetheless, this type of water and allowing the silt in suspension to be deposited. The *gabarbands* are proper dams made of stone and built about half way across hill torrents and small rivers. They are designed to capture both soil

rangement of an upright and a horizontal pole, withresearches on the saline basins in the Thar desert, and is also inconsistent with the reinforced by pollen frequencies at the
a bucket on one side and a counterweight on theSubsistence Economy one to fifteen.between periods. This view isotherwise barren landscape. It can also support the

other.

rangement of an upright and a horizontal pole, withdrainage system at Mohenjodaro and Harappa which could not have withstood any small patches of cultivable, rich and moist soil in an

a bucket on one side and a counterweight on the
rangement of an upright and a horizontal pole, with **rangement of an upright and a horizontal pole, with**
a bucket on one side and a counterweight on the ing was not a widespread, common practice and
researches on the saline basins in the Thar desert, and is also inconsistent with the
otherwise barren landscape. It can also support the

between periods. This view isThe black cotton soils of Gujarat, used for

other.
a bucket on one side and a counterweight on the

reinforced by pollen frequencies at the
reinforced by pollen frequencies at themarshes. Similar structures have been noted by a bucket on one side and a counterweight on theheavier rainfall than what the area now receives. The notion of a wetter climate has also Harappan site of Balakot near the coastother. other. *gabarbands*, which have atdrainage system

at Mohenjodaro and Harappa which could not have withstood any

structures known aspractice. With the collection of systematic archaeo
tracted structures known asA brief remark is needed on the peculiar

Valley at large. For instance, the settlement densities in northern Pakistan show no

other.theattention
botanical samples it may become possible to colA brief remark is needed on the peculiarof several which have at
tracted*Gabarbands,*structures known as *gabarbands,* dam-like structures observed in Balulaborate this through the analysis of weed assem
structures known as the**structures known as**attention ***gabarbands,***several archaeologists.

been contested on the basis of archaeologically attested settlement pattern of the Indusin Pakistan, which indicate that rainfall

(rain-fed) cultivation is practiced.in southern Kohistan where *Gabarbands* can Lambrick (57)

cultivablein Pakistan, which indicate that rainfall *barani* surface developed as thein Pakistan, which indicate that rainfall abbeen contested on the basis of archaeologically attested settlement pattern of the Indus

(rain-fed) cultivation is practiced. can tracted

tracted archaeologists. Valley at large. For instance, the settlement densities in northern Pakistan show nochistan and south-western Sindhseveraland assumedto in Pakistan, which indicate that rainfall patterns in the third millennium were *Gabarbands,*chistan and south-western Sindhseveraland assumed blages which would also allow some assessment ofValley at large. For instance, the settlement densities in northern Pakistan show noon the whole similar to those of today. Kohistan). The valley, about 7 miles in width in its *Gabarbands,*chistan and south-western Sindh dam-like structures observed in Baluand assumed tocorrespondence with the dry and wet cycles inferred from the pollen data. Also, Kohistan). The valley, about 7 miles in width in its *Gabarbands,* dam-like structures observed in Baluand assumedcounts, are not a direct measure of

chistan and south-western Sindh**chistan and south-western Sindhcorrespondence with the dry and wet cycles inferred from the pollen data. Also,** changing frequencies of tree and shrub species, represented by their fluctuating pollen Kohistan). The valley, about 7 miles in width in its

A clay model of an Indus plough, recovered from

drainage (25). This process in turn creates small
and assumed

on the whole similar to those of today. counts, are not a direct measure of vable land with rich soils reaching as deep as 30A clay model of an Indus plough, recovered from changing frequencies of tree and shrub species, represented by their fluctuating pollen

southern portion, provides a great expanse of cultisouthern portion, provides a great expanse of culti

rainfall fluctuations: theycounts, are not a direct measure of the Harappan site of Bananwali

changing frequencies of tree and shrub species, represented by their fluctuating pollen

As a counter point, the elephant,

feet. Rainfall in Sindh is highly variable and there

As a counter point, the elephant,
A clay model of an Indus plough, recovered from A clay model of an Indus plough, recovered from the Harappan site of Bananwali



rainfall fluctuations: they

counts, are not a direct measure of indicate that rainfall could have varied merely rhinoceros and tiger, all that inhabit A clay model of an Indus plough, recovered from the Harappan site of Bananwali rainfall fluctuations: theyindicate that rainfall could have varied rainfall fluctuations: theyfeet. Rainfall in Sindh is highly variable and there

vable land with rich soils reaching as deep as 30by the Harappans. Gypsum crystals found on a

the Harappan site of Bananwali
As a counter point, the elephant,

rhinoceros and tiger, all that inhabitwhich time the structures are often abandoned.

the Harappan site of Bananwali

forests, are among the animals depicted

indicate that rainfall could have varied reinforced by pollen frequencies at thebetween periods. This view is

forests, are among the animals depicted



between periods.
This view is

between periods. This view is

reinforced by pollen frequencies at theforests, are among the animals depicted on Harappan seals. As late as 1333 AD an Arab traveler, Ibn-e-Batuta, saw elephants in reinforced by pollen frequencies at the

Harappan site of Balakot near the coast

reinforced by pollen frequencies at the fields, as they can yield good crops with sufficient

on Harappan seals. As late as 1333 AD an Arab traveler, Ibn-e-Batuta, saw elephants in

in Pakistan, which indicate that rainfall

Harappan period. By the fourth millennium this was water. abundant and it is worthwhile to cultivate on these

lower Punjab and a rhinoceros in Sind. In later centuries the British hunted tigers in the fields, as they can yield good crops with sufficientHarappan period. By the fourth millennium this was

lower Punjab and a rhinoceros in Sind. In later centuries the British hunted tigers in the

water.

patterns in the third millennium were As this short description demonstrates, the

they continued in use into the Post-Harappan pepatterns in the third millennium were As this short description demonstrates, the

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would have been more lush in terms of

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lower Punjab and a rhinoceros in Sind. In later centuries the British hunted tigers in the

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Thus, it seems that if we are looking for of

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dam-like structures are often built in

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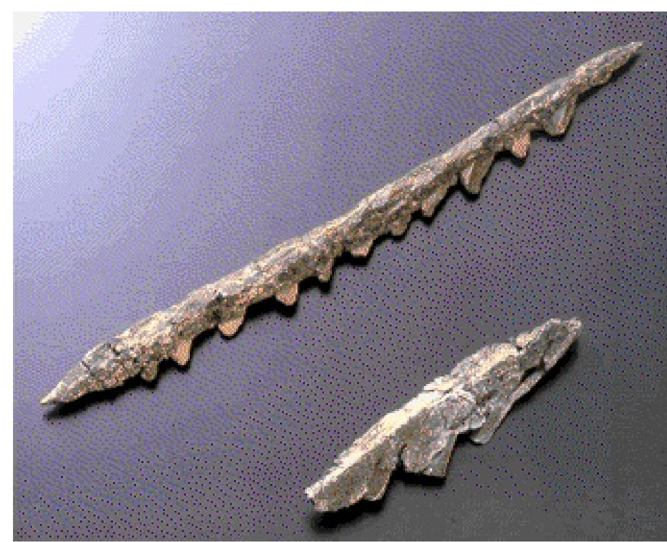
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cause. A much safer explanation for a rapid expansion in agricultural production is
cause. A much safer explanation for a rapid expansion in agricultural production is

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cause. A much safer explanation for a rapid expansion in agricultural production is provided by the fundamental advance in the tools of agriculture, marked by the climatic regime, was undertaken on rain alone (57) .

provided by the fundamental advance in the tools of agriculture, marked by the quence from**Under these circumstances and given the complete** all
absence of archaeological evidence, it does not
appearance of the plough, during the Early Indus cultures. Its presence during the Indus

absence of archaeological evidence, it does not **absence of archaeological evidence, it does not**

appearance of the plough, during the Early Indus cultures. Its presence during the Indus appearance of the plough, during the Early Indus cultures. Its presence during the Indus herent biases in data collected from different types appearance of the plough, during the Early Indus cultures. Its presence during the Indus civilization is confirmed not only by the evidence for ox-haulage, but also by the

absence of archaeological evidence, it does not of sites, excavated at different times, using differentcentralized **civilization is confirmed not only by the evidence for ox-haulage, but also by the**
period,
period,
complex
canal
systems

canalseem necessary to invoke, during the Harappancentralizedcivilization is confirmed not only by the evidence for ox-haulage, but also by the discovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has canal systemsmanagement for the irrigation of the land. This arcentralized civilization is confirmed not only by the evidence for ox-haulage, but also by thediscovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has period, complex systems andmanagement for the irrigation of the land. This ardiscovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has been found at the Indus settlement at Shortughai in northeastern Afghanistan. A similar gues strongly against the application of Wittfogel's management for the irrigation of the land. This ardiscovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has discovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has

made use of animal traction, reducing the human
gues strongly against the application of Wittfogel's evidence is available at Kalibangan, although its authenticity has been challenged. management for the irrigation of the land. This ar

discovery of a clay model of the plough at Banawali. Furthermore, a ploughed field has

been found at the Indus settlement at Shortughai in northeastern Afghanistan. A similar gues strongly against the application of Wittfogel's evidence is available at Kalibangan, although its authenticity has been challenged.numbers of 'Oriental Despotism' model of the state to the an archaeobotanical evidence is available at Kalibangan, although its authenticity has been challenged. cient Indus Valley (58). 'Oriental Despotism' model of the state to the an

The been found at the Indus settlement at Shortughai in northeastern Afghanistan. A similar cient Indus Valley (58).Ground Preparation and Tools: There is asarchaeobotanical
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evidence is available at Kalibangan, although its authenticity has been challenged.

Ground Preparation and Tools: There is as
cient Indus Valley (58).yet comparatively little evidence for the actual tools **Page 449 yet comparatively little evidence for the actual tools There is as**

The evidence is available at Kalibangan, although its authenticity has been challenged.Page 449 Page 449 employed for agriculture during the Harappan Civiliyet comparatively little evidence for the actual tools


Page 449

Page 449 yet comparatively little evidence for the actual tools
A hafted stone tool, probably a sickle, found at employed for agriculture during the Harappan Civili
A hafted stone tool, probably a sickle,
zation. The use of plough has already been mening dozens of species (28). Its size, length of occuzation. The use of plough has already been men

radically

zation. The use of plough has already been men
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zation. The use of plough has already been men
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found at Mehrgarh in the Early Indus

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293
full-time nonfarming activities such as craft production and trading expeditions.

The earliest clear evidence for ploughing in South Asia comes from preserved tillage marks sealed beneath Early Harappan levels at Kalibangan on the Ghaggar-Hakra river in northern Rajasthan (27). These show that ploughing was established prior to urbanization in the major river basins. In addition, there is a possible schematic depiction of ploughmarks painted on a piece of pottery from Mohenjo-daro. However, it is possible that ploughing was not a widespread, common practice and that the inundated soils were not subjected to this practice. With the collection of systematic archaeobotanical samples it may become possible to collaborate this through the analysis of weed assemblages which would also allow some assessment of the importance of tillage in other regions.

Yields would also be higher if the seeds were carefully sown rather broadcast. The crisscross plowed furrows at Kalibangan would have required careful sowing along the furrows in order to maintain the clear separation between the two crops grown in the field; this suggests that sowing rather than broadcasting was practiced even in Early Indus times. In Mesopotamia, where a seeder plow was used,

a field could be sown using less than half the seed that would be required for broadcasting, and the ratio of sown to harvested seed could be as high as one to fifteen.

The black cotton soils of Gujarat, used for *kharif* cultivation, also did not require plowing: Deep cracks that opened during the dry season adequately turned and broke up the soil, and a new cultivable surface developed as the ground absorbed the summer rains and swelled up, sealing the cracks again. The ground needed only to be harrowed before sowing.

Apart from the plow, very little is known about the agricultural tools or cultivation techniques used by the Harappans. Gypsum crystals found on a sherd at Kalibangan may have been used as a fertilizer. Harvesting was probably undertaken with a flint blade or flint-edged sickle. It seems likely that this ancient practice was followed during the Mature Harappan period. By the fourth millennium this was the only use made of microliths at Mehrgarh, and they continued in use into the Post-Harappan period, being present at Pirak.

Reconstruction of Harappan Agriculture Evidence from Harappa: Where most existing reconstructions of Indus civilization agricultural strategies draw upon data from a number of overlapping sites to produce a sequence, Harappa offers a unique opportunity to develop an agricultural sequence from a single site that incorporates all phases of this civilization, avoiding some of the inherent biases in data collected from different types of sites, excavated at different times, using different collection and analysis strategies. Harappa is one of the few sites that span the complete temporal range of the Indus civilization; it is also one of the few sites where large numbers of archaeobotanical samples have been collected and analyzed in a systemic manner. This has led to the collection of tens of thousands of carbonized seeds, representing dozens of species (28). Its size, length of occupation, large horizontal exposures, detailed archaeological documentation, and quality of organic preservation mean it is one of the few prehistoric urban centers in South Asia where the relationship of agricultural change and culture change can be comprehensively addressed. Steve Weber (28) summarizes his results as depicted in Table below:

Regardless of the period, the most common plants recovered at Harappa were cereals, followed by pulses and vegetables, and finally oil-seed, fiber, and fruit plants. This pattern may be due to the fact that plants that are crushed for juice or oil, dried for later use, or species consumed in a fresh state such as roots, greens, fruits, and nuts are less likely to be preserved than seed plants that are parched, cooked, or processed in close proximity to fires.

Thecerealscategory,comprisingwinter/ spring harvested cereals of wheat *(Triticum)* and barley *(Hordeum),* makes up the majority of the recovered remains. Grains of these cereals are found in nearly every sample and together make up over 90 percent of all seeds recovered from the Early Harappan Period. While seeds of wheat occur in nearly as many samples as barley, it is evident that barley is the dominant grain. With an average of four more barley seeds per liter soil and making up 9 percent more of a sample, barley was being burned more frequently and subsequently being preserved in the archaeological record at a higher rate than wheat.

Other winter/spring harvested crops represented in samples from these early levels of Harappa were lentils *(Lens)*, pea *(Pisum),* grass pea *(Lathyrus),* and jujube *(Ziziphus).* They are present in fewer than half the samples and to- gether account for less than 3 percent of the recovered seeds. This period also had low counts of the summer/fall harvested crops of date *(Phoenix),* grape *(Vitis),* and millets *(Panicum),* which accounted for less than 2 percent of the seeds and had a ubiquity rating of less than

10 percent. Clearly, the basis of the agricultural strategy at Harappa during the Early Harappan Period was the winter cultivation of wheat and barley. The people who settled this site brought with them cereal grains, and a proven agricultural strategy for this region of Pakistan involving wild plant collecting and some cultivating of vegetables and fruits. They focused, however, on wheat and barley.

By 2600 B.C., or the beginning of the Harappan Period, a more extensive agricultural system involving a greater variety of plants was in place. Although wheat and barley still appear to have been the mainstays of the agricultural system, they now account for only 81 percent of the seeds with ubiquity dropping to 90 percent. A combination of summer millets, rice, vegetables, fruits, oilseed, and

fiber-oriented crops make up an increasing proportion of the cultivated plants. While the agricultural strategy is still one based on winter/spring harvested crops, the roles of wheat and barley seem to be reversed. Wheat now accounts for 45 percent of the recovered seeds compared to barley with only 36 percent of the total. Wheat is up 3 percent from the early period while barley is down 15 percent from that same period.

In general, the data as presented in the above table, demonstrates that some trends and regularities remain constant for all periods of occupation at Harappa. In fact, if you look at the archaeological seed record as a single entity, and averages for all samples together, the same general pattern or agricultural strategy occurs in each period. This strategy focuses on sowing crops in the fall, relying on winter rains to feed them, and then harvesting them in the spring. It is one that is typical for sites in this region (29). While winter sown cereals are found in nearly every sample and make up the majority of the archaeobotanical remains from each sample, the agricultural strategy is more diverse and includes some summer sown cereals and a variety of pulses, vegetables, and fruits. A complex multicropping strategy is evident in all periods of occupation, although it appears to increase in importance over the occupation of the site. While the overall strategy may appear to be constant, we can identify a number of patterns that are important to understanding change at Harappa.

First, there is a growing importance of summer crops. As time went on, seeds from summer crops were being preserved throughout Harappa implying though the density of summer-cropped seeds and their overall percentage of a given sample increase little over time, both show significant increases relative to the winter crops. Clearly summer-cropped plants became increasingly important at Harappa. With more efforts at multicropping, agricultural intensification was occurring. There appears to have been a constant and gradual process of increasing use of summer cropped plants, with the biggest jump seen in the Late Harappan samples. It is in this Late period where we see the summer-cropped seed density and ubiquity at its highest and most significant levels relative to the winter-cropped plants.

There is also a constant increase in the number of different species being cultivated at Harappa. With few crops ever disappearing from the diet, each period sees a significant increase in crop diversity. This increasing diversity of food plants implies that people at Harappa were broadening their use of crops without abandoning existing plants. The new crops were not used as replacements, nor was their initial use extensive. These plants, whether local varieties or species being introduced from great distances away, appeared as part of a gradual process of supplementing existing crops. at more locations increased use. Al

The broadening of the agricultural strategy at Harappa was neither rapid nor sudden. Each subsequent

period contains a greater variety of plants and represents an increasing effort at cropping throughout the year. Associated with this pattern is an increase in the proportion of weed seeds. While they make up no more than 2 percent of the material in the Early Period, they increase to over 10 percent in the Harappan period and nearly 15 percent in the Late period. Their presence in the samples is useful for reconstructing crop husbandry practices since they commonly grow in agricultural fields and are removed prior to consumption. They also could reflect use as medicine, a food supplement, or even an increase in disturbed areas throughout the area. Further, the mix of weedy species and cereal grains may also reflect an increased use of dung as a fuel.

The fifth and final pattern showing change, and one of the most interesting, is seen in the changing proportions of the cereal grains. While the summer cereals are increasingly important, the shift from one taxon to another is best seen in the wheatbarley record. At the earliest occupation, barley is the dominant grain. During the Harappan Period, wheat increases in ubiquity, density, and percentage until it becomes the most common species at Harappa. Finally, in the Late Period, wheat declines and barley once again becomes the dominant cereal.

Skeletal' Records and Dietary Conditions: The examination of Harappan skeletons at Harappa and those of the Early Indus period at Mehrgarh has shown that human stature and the size of teeth have both contracted after the coming of agriculture. The human height further decreased with the onset of urbanization in the Indus Valley. This is shown from a comparison of the skeletons at Cemetrey R37 at Harappa with those at Mehrgarh. On the basis of a large number of skeletons from Cemetry R37 at Harappa, the average adult stature of men has been estimated at 1.67 meters and women at 1.55 meters. This compares unfavorably with that of 1.80 meters for men and 1.70 meters for women at earlier times at Mehrgarh.

Consumption of cultivated produce and wellcooked food caused much dental deterioration. The Indus population was also subject to visitation of malaria, as shown by a study of Mohenjo-daro skeleton. This epidemic, whose presence in Pakistan is established for the first time from this evidence, must have spread rapidly in the crowded habitation of the Indus towns. Life expectancy has not yet been calculated for the Indus people; but out of 90 skeletons from the Harappa cemetery, as many as thirty-five came from the age group 17-34 years, twenty-seven from 35-55 years, and just thirteen from over 55 years. Only fifteen are minors, that is, below 17, so that many children were not buried at all and so remained outside our data. Allowing for this exclusion, it would be surprising if the real average life expectancy exceeded 30 years. It is, however, hard to say if this low life expectancy was due to the dietary conditions of the Harappans, reflecting on the subsistence economy, or due to the epidemics such as malaria.

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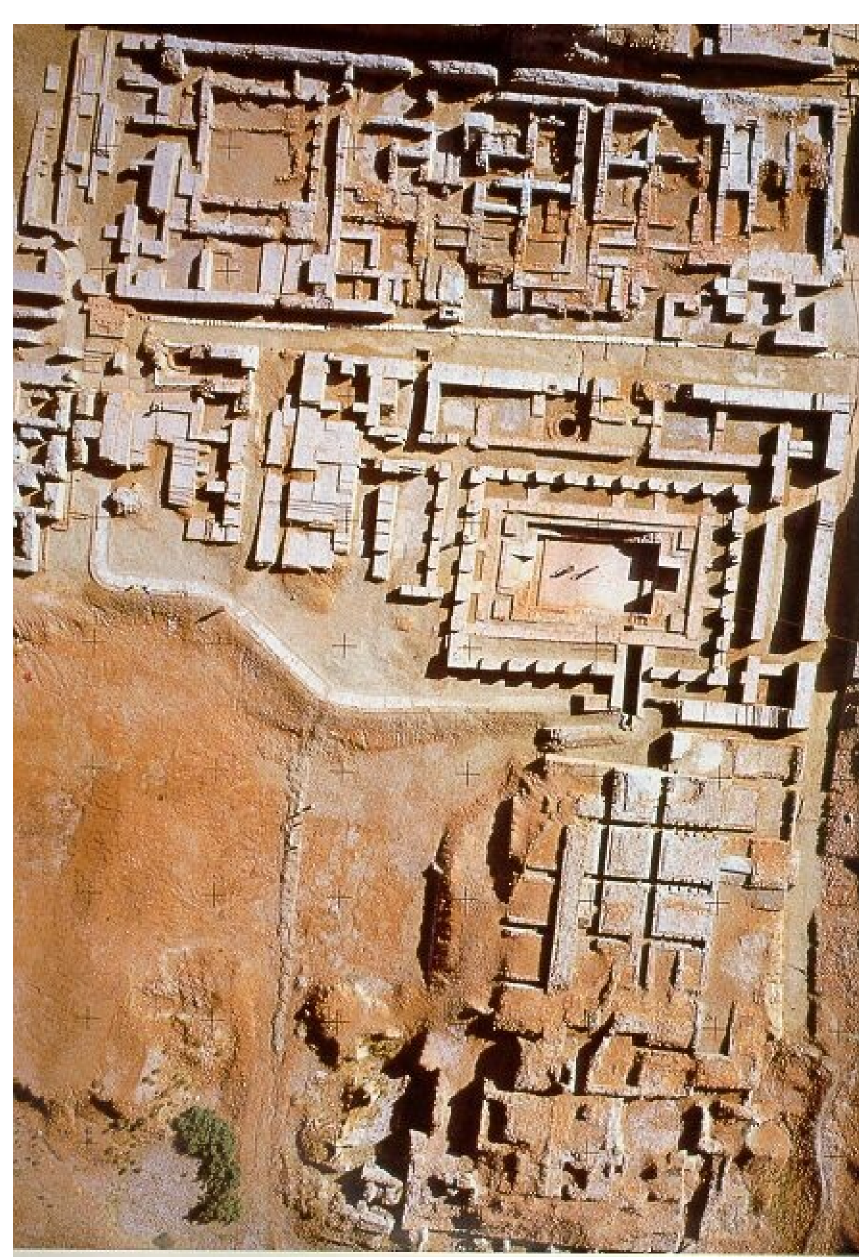
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Town Planning Harappan Civilization - The Material Culture

Chapter 12

Town Planning



One of the most distinguishing characteristics of Harappan Civilization is its emphasis on town planning. This element of Harappan Civilization sets tion material, stone foundations for erecting brick

One of

walls, digging of wells and lining them with mud

the most dis

bricks and stone, and in some cases a semblance

tinguishing

of streets layout, can be discerned without much

character

difficulty in the Early Harappan cultures of Baluchistan and Sindh. During the Urban Phase, all of these

istics of Harappan

elements of town planning and architecture were

Civilization is its em

The perception of how the Indus cities were

phasis on town planbuilt is necessarily derived from the excavations at

Mohenjo-daro and Harappa, although several other

ning. This element ofsites furnished additional details to confirm the gen

eral conclusions reached at the two main sites.

Harappan

Mohenjo-daro had been much less disturbed than

Civilization

Harappa, which was especially ravaged by brick

sets it apart from thatNorthwestern

Railway, now Pakistan Railways. Whether the Indus

of

cities were built (or rebuilt) on the existing sites or

Mesopotamia **and**

on new grounds has also something to do with the

Egypt

examples of Harappa and Mohenjo-daro. Harappa

where cities

was apparently built at an existing Early Indus site although commonsense would dictate that a

arose haphazardly and the town streets followedplanned city could not have arisen out of an existingcities arose haphazardly and the town streets folvillage or town and some deliberate demolition must
the pre-existing walkways. Contrary to the Indushave been involved to make way for the plannedIndus cities, where the provision of water to the city streets and sewage system. On the other hand, the
cities, where the provision of water to the city popuwater level has risen so much at Mohenjo-daro thatsense of top priority, the towns and cities of Mesowe cannot now determine whether it was built on an
lace and its drainage out of the city acquired aEarly Indus settlement, as was Harappa, or estabfact, a meticulous town planning with generally

straight streets and lanes intersecting each other mostly, although not always, at right angles, public

sense of top priority, the towns and cities of Mesonevertheless,

concluded that beneath the Harappan phase lies the Kot Diji phase at Mohenjo-daro also.

potamia and Egypt were devoid of such facilities. In

the previous or contemporary Bonze Age civiliza

fact, ations in the world. During the whole period of abouttown

500 years, Harappan cities maintained this charac
Most of the Indus cities were built on new

planning withgrounds and a fewer number on the existing Early meticulous Indus sites. There is evidence of burning at severalgenerally

straight streets and lanes intersecting each other Early Harappan settlements in Sindh beneath the

not see any sign of encroachments or abandoning remains of the Mature Harappan remains. There

mostly, although not always, at right angles, public are also a wide-spread abandonment of pre-Urban

tail-end of the Harappan Civilization that we notice a settlements and discontinuation of inhabitation. On

wells, and drainage system was found nowhere in the other hand, there is also evidence of continuity

deterioration of architecture, coupled with a de in inhabitation into the Mature Harappan phase.

the previous or contemporary Bonze Age civiliza **Since most of the Harappan cities and towns were**

As discussed in Chapter 5, recent discover re-planned before they were built, a partial destruc

tions in the world. During the whole period of about tion of the old structure is a foregone conclusion.

ments of the Indus town planning which were al It appears that once a basic layout was de

500 years, Harappan cities maintained this charac termined and new structures build, the overall plan

riod in the fourth millenniums BC, and in some did not change. In other words, the city rose steadily

teristic and despite neglect here and there, we do without changing the basic layout of the city and

on which houses were commonly constructed, and generally without changing the architecture of the

not see any sign of encroachments or abandoning buildings. At Mohenjo-daro the lower level of a

rounded some of the settlements are evident in house might be filled up to rise above periodic

the general framework of city plans. It is only at the floods; fresh floors were then raised on top. Some

period. The use of mud bricks as a main construc houses decayed naturally, to be rebuilt on top of the

tail-end of the Harappan Civilization that we notice a

general neglect of town planning, along with a rapid deterioration of architecture, coupled with a de

eral conclusions reached at the two main sites. Mohenjo-daro had been much less disturbed than Harappa, which was especially ravaged by brick robbers Railway, now Pakistan Railways. Whether the Indus cities were built (or rebuilt) on the existing sites or on new grounds has also something to do with the examples of Harappa and Mohenjo-daro. Harappa was apparently built at an existing Early Indus site although planned city could not have arisen out of an existing village or town and some deliberate demolition must have been involved to make way for the planned streets and sewage system. On the other hand, the water level has risen so much at Mohenjo-daro that we cannot now determine whether it was built on an Early Indus settlement, as was Harappa, or established concluded that beneath the Harappan phase lies the Kot Diji phase at Mohenjo-daro also.

grounds and a fewer number on the existing Early Indus sites. There is evidence of burning at several Early Harappan settlements in Sindh beneath the remains of the Mature Harappan remains. There are also a wide-spread abandonment of pre-Urban settlements and discontinuation of inhabitation. On the other hand, there is also evidence of continuity

in inhabitation into the Mature Harappan phase.

leveled debris. The street level also rose. The houses and their ultimate adjustment to it were raised still higher on the same walls or the same room plan with very little change. The wells were built up so high on the original brick lining that they look like factory chimneys as the excavation goes to deeper levels. Only towards the end are there signs of decline and disorder. Some of the upper-level houses, crudely built of poorer materials, encroached upon the street plan; which means that the particular quarter of the city was then ruined. Pottery kilns appeared within city limits, as they never had at any earlier stage.

Pre-planned cities are the norm in the Harappan phase but it is not true in all cases and not all Harappan cities are planned like Mohenjodaro or Harappa. For instance, the urban settlements in Gujarat, such as Lothal and Surkotada, or even some of those in the Indus plains itself, the sites like

Kot Diji and Amri, do not show any extensive town planning, notwithstanding the evidence for a general likeness with Mohenjo-daro and Harappa. Harappa itself was an old place by the time the Harappan urbanization began, and this would have probably constrained the would-be civic planners there. Thus, as close examination of the plan of Harappa will reveal, it is only vaguely like Mohenjo-daro. On the other hand, even some small settlements of the time, the settlements that cannot in any way be categorizes as towns or cities, show well thought-of town planning. Thus, there is a spectrum of varying degree of town planning in the construction of the Indus cities.

Furthermore, we observe quite a few stark differences between the cities and towns in the Indus plains and those on its eastern or western fronts. Even within a specific geographic area, some towns exhibit a degree of town planning while the other are simply an outgrowth of the Early Harappan settlement. This evidently means that the Indus cities and towns were not as uniform and as monotonous as they have been made to be. We see Indus towns with meticulous town planning, we see some without any deliberate town planning, we see different types of town planning in different times, we see a diversity of the construction material used, and we see different modes and styles of construction that changed with time.

In spite of these differences between the various Indus cities, however, a number of them do mimic Harappa and Mohenjo-daro. There seems to be a common thread running through the architectural style and conceptual layout of settlements, and it is through this commonality that the Indus Civilization is above all recognized. The grid pattern with its modularity, the street drains, cesspits, pipes, the generally rectangular small rooms on the ground, the brick-lined bathing floors, the presence of wells in and among the buildings, the town walls, the stairways, etc., are found in the habitation areas so far as they are now known at Mohenjo-daro, Harappa, Chanhu-daro, Lothal, Kalibangan, and host of other sites. In other words, the evidence is overwhelming for town planning of a singularly advanced kind throughout the civilizational area and in spite of the regional differences, which were substantial, the collected evidence shows that the Harappan cities were carefully planned.

A typical city would be divided into two or more sections, each fortified separately. One section, known as the acropolis or citadel, was located on an artificially raised mound while the other levels were on lower ground, and hence called the ‘Lower Town’. The citadel probably contained the important buildings of the city, like the assembly halls, religious structures, granaries and in the case of Mohenjo-daro the famous Great Bath. The lower section of the city was where the housing for the inhabitants was located. The city was well connected with broad roads, which met at approximately right angles. The houses were located in the rectangular squares thus formed.

Most of the large Harappan towns were encompassed by elaborately designed walls with gateways. The Indus towns possessed no general system of urban fortification and the gateways were simple entry-points to the towns. At Surkotada and Dholavira these gateways were quite elaborate, while at other towns they were very simple.

Some of the gateways had attached guard rooms, which were invariably very small. The Harappan fortifications were not meant to defend the townships from strong attacks by enemies but were safety measures from robbers and cattle raiders. The fortifications also provided protection against floods and served as the hallmark of social authority over the area they commanded.

An advanced drainage system is also in evidence. Drains started from the bathrooms of the houses

and joined the main sewer in the street, which was covered by brick slabs or corbelled brick arches, depending on its width. Like street planning, the construction of drains seems to be pre-existing feature from the Early Indus phase. The evidence for this is not that robust but it is there.

Some common features of the Harappan cities have already been discussed in Chapter 6. these have been further illustrated in Chapter 7, 8 and 9 in context of some particular urban centers. Here we consolidate this material as it relates to the city planning in general. Some degree of repetition is unavoidable but it has been kept to a minimum. We shall concentrate here on the general layout of the Harappan cities, which essentially address the issue of the citadels and the lower towns. The construction of city walls around the various sectors of the city is an integral part of this subject and so is the construction of raised platform to erect housing structures on. Street planning is also important and so is the frequently discussed sewerage systems. Indus cities are known to have made provision of fresh water, some through digging of wells and some through an elaborate system of catching However, this two-tier system of habitation is not as universal as it is generally believed to be. For example, the city of Harappa consisted of several suburbs, each with its own city-wall. These neighborhoods were established at different times as the city grew, but they all were inhabited by people who shared the same culture. Characteristic styles of painted ceramics, clay figurines, inscribed seals and ornaments have been recovered from all of the exrainwater. This aspect of city planning acquires more importance in some cities than the others.

Multi-tier Inhabitation: From the prospective of town planning, the Harappan cities are characterized by the existence of two-tier township, that is, a higher but small mound, generally referred to as the ‘citadel’ and a lower but larger mound, generally referred to as ‘lower town’. The ‘citadel’ being set apart from residential area, the presence of ‘granaries’ or ‘warehouses’ at some Indus sites,Town Planningcavated mounds, and there is evidence for the possible occurrence of *carvansrais* outside the city
gates, general isolation of domestic quarters from
workshops, the existence of purely ’industrial es

Pottery kilns appeared within city limits, as they

movement of goods from one sector to the other. There is a strong suspicion that in the final analysis the city of Mohenjo-daro was also a multi-tier city,

plan of Harappa will reveal, it is only vaguely like
tates’, like Chanhu-daro and several such sites in
Cholistan, the discovery of the so-called “coolis’in
probably without inter-suburbia walls. The city of
Mohenjo-daro. On the other hand, even some small
the
Lothal apparently consisted of three distinct town
settlements of the time, the settlements that cannot

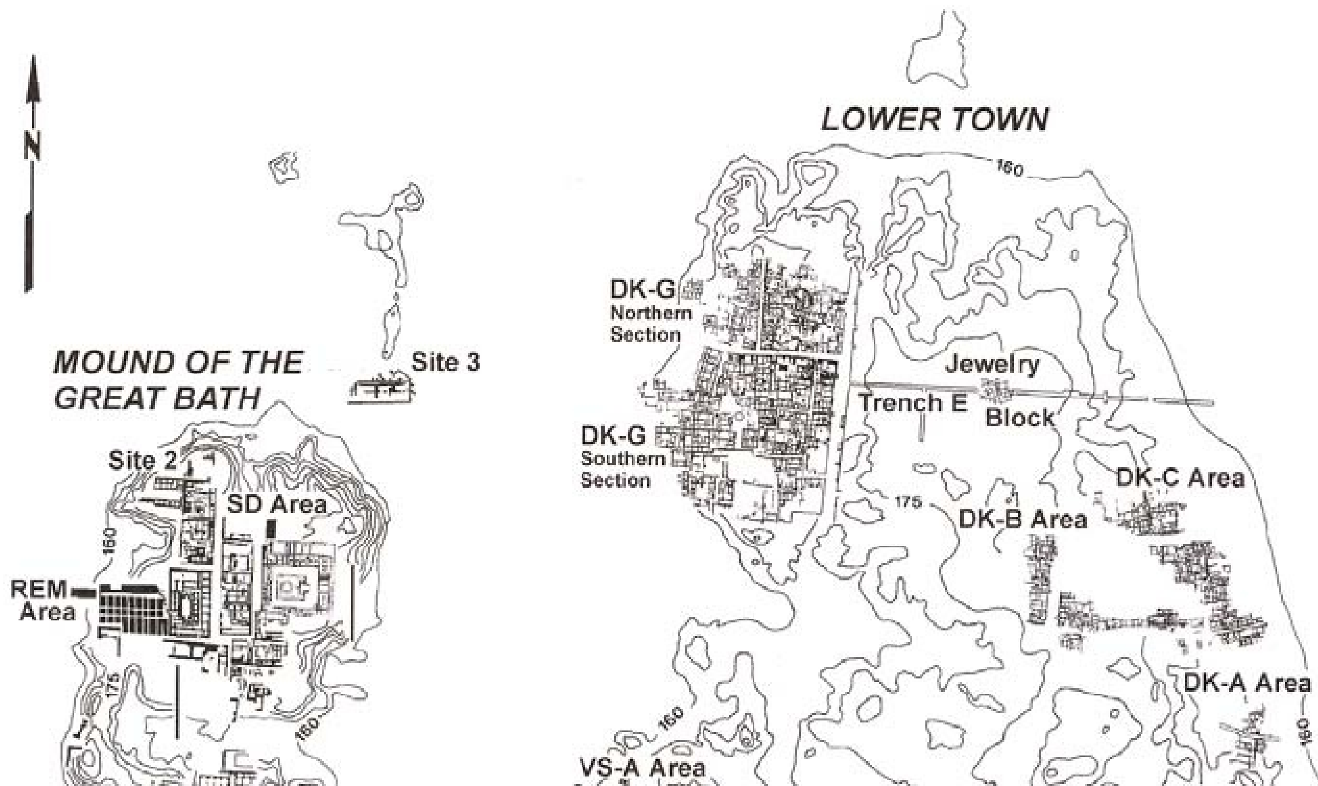
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Most of the known and excavated Indus

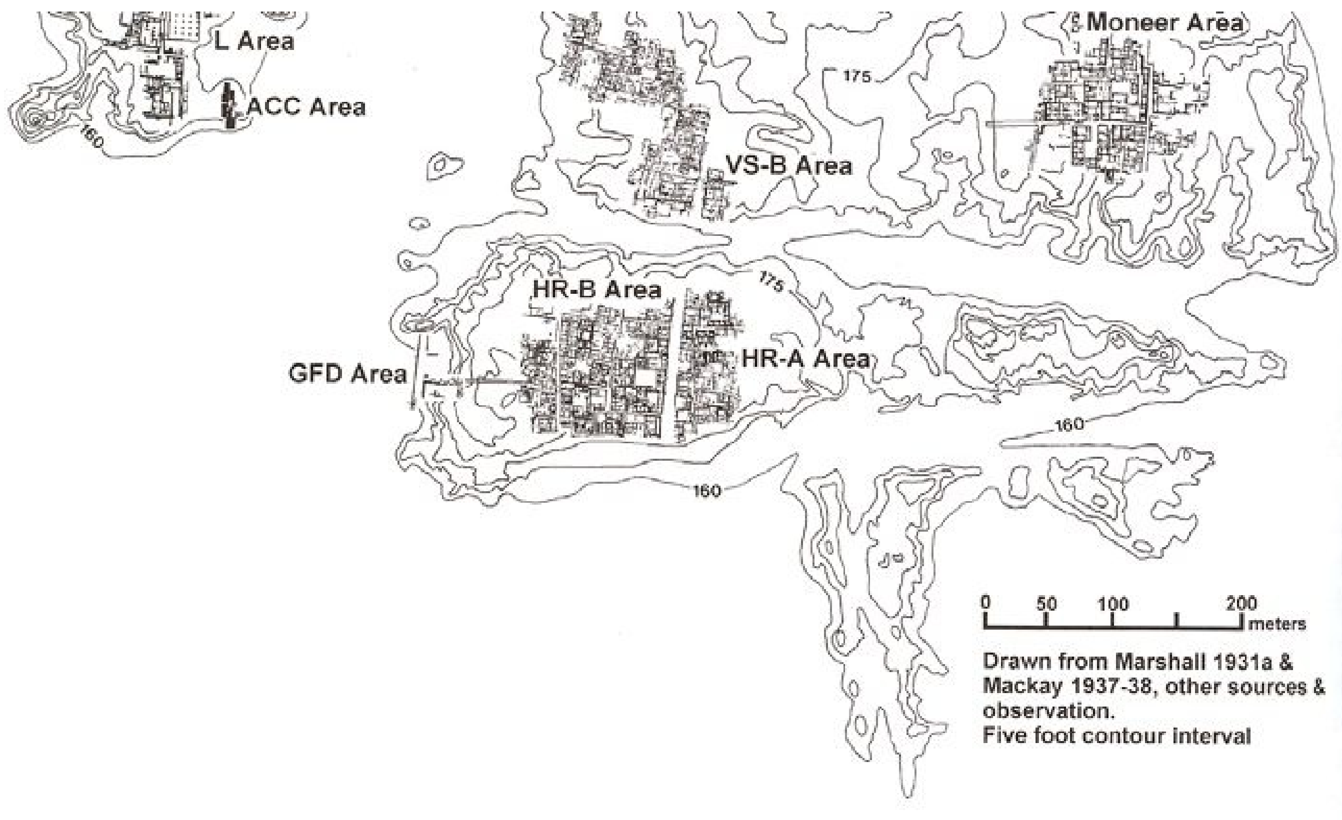
ships, all three mutually integrated. The same situain any way be categorizes as towns or cities, show tion is apparent at Kalibangan in the Indo-Gangetic well thought-of town planning. Thus, there is a Divide. As our information becomes clearer, we arespectrum of varying degree of town planning in the

ments in Gujarat, such as Lothal and Surkotada, or construction of the Indus cities.

sites conform to this general picture of habitation. beginning to realize that a two-tier habitation syseven some of those in the Indus plains itself, theTown Planning! Furthermore, we observe quite a few stark



The “Citadel” built
on a raised plat
form



The residential area built
on a series of lower plat
forms

The plan of Mohenjo-daro: most of the Indus towns follow this pattern

The plan of Mohenjodaro: most of the Indus towns follow this pattern 258
Railways. Whether the Indus cities were built (or rebuilt) on the existing sites or on new sites like Kot Diji and Amri, do not show any extendifferences between the cities and towns in the Insive town planning, notwithstanding the evidence
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tem, so far believed, may not be the norm for the Harappan Civilization - The material culturevetment in the northwest of the mound but a freeHarappan Civilization. A multi-suburbs habitation
pattern of cities and towns may in fact be closer to
reality. These city suburbs may or may not have

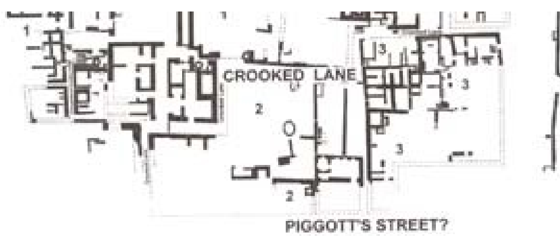
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been individually walled and not all population must
see Indus towns with meticulous town planning, we
be living within the city walls. In all these elements a
see some without any deliberate town planning, we
whole range of variation exist and a broad spectrum
see different types of town planning in different
of these features must be assumed to characterize
times, we see a diversity of the construction mate
the cities of the Indus Civilization.rial used, and we see different modes and styles of

City Walls and Gates: Major Indus settleconstruction that changed with time.
ments were generally surrounded by massive walls,
standing wall with gates around its south side. Frequently there were bastions and sometimes towers,
and there were generally a number of imposing

generally rectangular small rooms on the ground, gateways, as described in context with the 'cita
the brick-lined bathing floors, the presence of wells dels'.in and among the buildings, the town walls, the
Gates probably controlled access between
stairways, etc., are found in the habitation areas so far
as
they
are
parts of the settlement that were separately walled,
now known Harappa,
such as the citadel, and the ordinary residential ar
Chanhu-daro, Lothal,
at Mohenjo-daro, Kalibangan, and
eas. At Dholavira, a gateway with bastions and
host of other sites. In other words, the evidence is flanked by chambers gave access from the Lower

still higher on the
chimneys as the
kilns appeared





DK-G area of Mohenjo-daro magnified. This is a fine example of Harappan town planning

DK-G area of Mohenjodaro magnified. This is a fine (*after Mackay*) example of Harappan town planning

In spite of these differences between the(after Mackay) overwhelming for town planning of a singularly ad

constructed of baked bricks, mud brick, rubble, or various Indus cities, however, a number of them do stone. In many cases these were retaining walls for

mound, generally

mimic Harappa and Mohenjo-daro. There seems to mud brick platforms, in others they were freestand be a common thread running through the architec ing circuit walls, and they might be both. For exam tural style and conceptual layout of settlements, and ple, the wall around Harappa mound E was a re it is through this commonality that the Indus Civiliza tion is above all recognized. The grid pattern with its 259 modularity, the street drains, cesspits, pipes, the Town to the Middle Town. A stone bar laid on the vanced kind throughout the civilizational area and in stone sill of the gateway contained slots thought to spite of the regional differences, which were sub have been used to hold wooden planks to close the stantial, thegate when required.the collected evidence shows that Harappan cities were carefully planned.

A typical city would be divided into two or more sections, each fortified separately. One section, known as the acropolis or citadel, was located

The use of demarcation or defensive walls around townships is an old Indus tradition, probably originating during the 7th millennium BC in Baluchistan as timber stockades around permanent settlements and goat pens. By the fourth millennium BC, mud and stone walls replaced timber stockades. Some of these archaeological remains have been excavated, mainly in Sindh, and reported in detail. The earliest fortified town to date is found at Rehman Dheri dated 4000 BC close to the Zhob Valley. Other fortified pre-urban towns found to date are at Amri (3600-3300 BC) and Kot Diji in

Sindh. The town wall at Kohtras Buthi in Sindh Kohistan is another strong evidence for the beginning of demarcated settlements in the Early Harappan period. The pre-Indus mound at Kalibangan (3000 BC) is also surrounded by a wall, and so are Tharo Hill and Dhilanjo-kot in the plains of Sindh.

A strong continuity of this tradition, that is, surrounding the settlement with a massive wall, well into the Harappan phase and then into the medieval times is easily evident. Most of the major Harappan sites show at least some remnants of city walls, Harappa being the primary example. Such defensive or demarcation walls, with their gateways, are in fact one of the characteristic features of the Indus cities. However, not all Harappan settlements have produced the evidence of town walls. The sites that show at least parts of fortification or demarcation walls are Harappa, Mohenjo-daro, Sutkagendor, Ali Murad, Kalibangan, and Surkatoda.

At Harappa, there were several walls, each of which enclosed widely dispersed sections of the city. Most walls at Harappa were constructed of mudbrick though some had baked brick exteriors. One wall, for example, consisted of a 13 meter wide base made of mudbrick and an exterior baked brick facing of 1.2 meters. Portions of town walls at Harappa, belonging to the Mature Harappan period, have been excavated by Wheeler and then by Kenoyer and Meadow. The wall at the citadel is in the form of a parallelogram, 420 m long north-south and 197 m wide east-west, enclosing the top of the mound. The outer wall had a basal width of 12 meter and a height of over 10 meters, constructed of mud bricks over a rampart of mud and debris, 3 to 6 meter in height. The wall was externally riveted with a facing of baked brick and reinforced at intervals by rectangular towers or salients which provided an elaborate system of enfilade. There were two gateways, one each on the north and the west; the former provided the main entrance. The gateways were flanked by guardrooms and ramps. Wheeler described a port in of one such wall that he excavated as follows: “ On the western side a curved reentrant in the defenses, controlled by a bastion, led to a system of extra-mural ramps and terraces approached by gates and supervised from guardroom. At the southern end of this system there seems to have been a ramp or stair leading up on to the citadel. It is likely enough that the normal ascent from the flood plain was steps” (10). Thanks to the careful excavations conducted at Harappa, archaeologists have been able to document episodes of destruction and rebuilding of some of the wall (8).

There is no clear evidence that Mohenjodaro was fortified by a defensive wall but the existence of such a wall around the citadel mound has been assumed nevertheless. There is some indication that two rectangular bastions on the southeast defended a gate and its approaches. If such a gate indeed existed, it was later blocked and replaced by a platform where around a hundred baked clay missiles were found stacked. These tower-like structures are considered to have been a part of a small ‘fort’.

The Harappan city of Sutkagendor on the Makran coast also shows the existence of a city wall. The foundation and the base of the wall are 30 feet wide but the outer face of the wall slopes inwards at about 40 degrees as it goes up. The structure is built of a large roughly squared stone blocks set in mud. The main entrance faces south and is eight feet wide, flanked by a huge rectangular tower which command the main approach. A southern extension of the wall leads to fortified outposts 40 yards away. The outer wall is estimated to have been 20-25 feet high.

As discussed in Chapter 9, at Dholavira a wall in the high section of town enclosed an area that measured 47 hectares. It was constructed of stone rubble and mudbrick and enclosed the entire complex, where additional walls divided portions of the interior spaces.

The walls at Dholavira and Harappa could not be entered except at special gateway auroras. One wall at Dholavira, for example, was accessible through gates on three sides. Another featured mudbrick-filled ramparts faced with stone and several gates, some of which contained stairways. It also had sunken passageways and screenwalls. Screenwalls created alleys or corridors between the two walls.

Ali Murad in Sindh is another Harappan site that clearly shows the remains of a city wall constructed with roughly square stone blocks. This fortified site guarded the Phusi Pass in the Kirthar range, one of the approaches to the Sindh plain from the west. On the east, Kalibangan must be mentioned as an example of a fortified Harappan city. A 7 meter thick wall of mud brick has been reported with towers at intervals. The citadel section was independently walled in the manner of Harappa. Moving to the south, Surkotada is an example of the fortified Harappan settlements in Gujarat. Interestingly, both the lower town and citadel are walled like Harappa and Kalibangan.

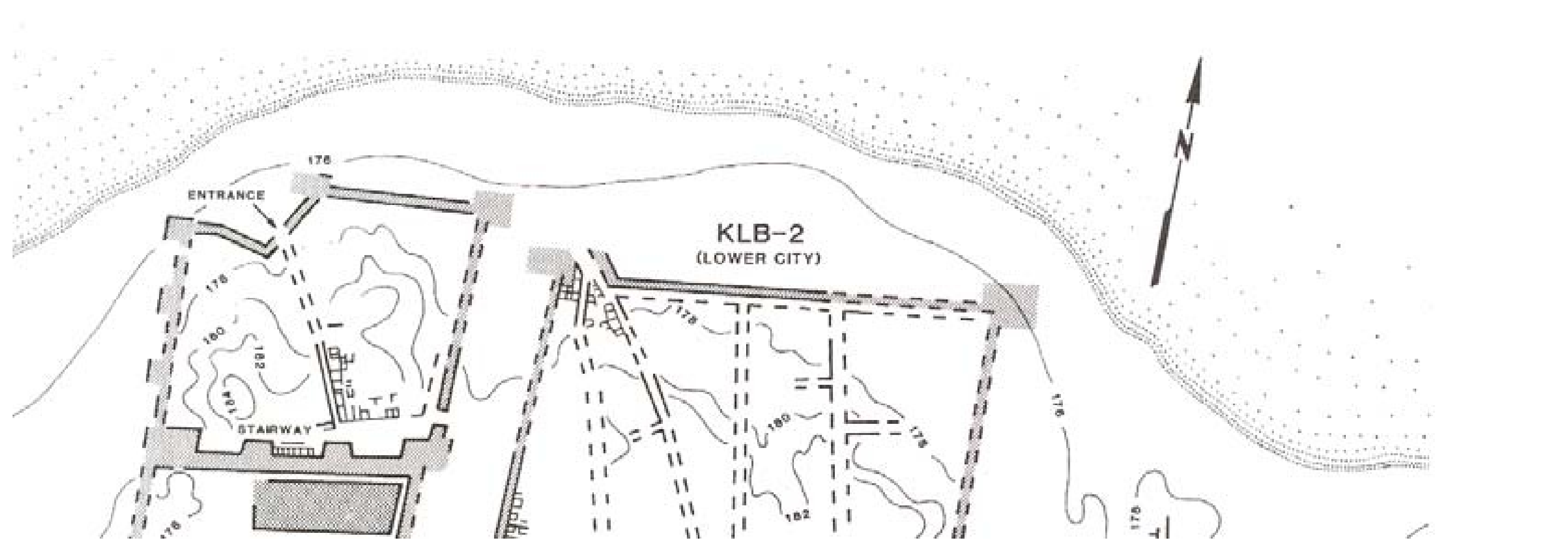
There are indications, especially at Harappa and Mohenjo-daro, that not all inhabitants of the city lived within the city-walls. This reflects the rapid increase in the city population at some point in time. The inhabitants living outside the wall must be full participants in the economic life of the city but it is doubtful if they were fully integrated into the city Town Planning

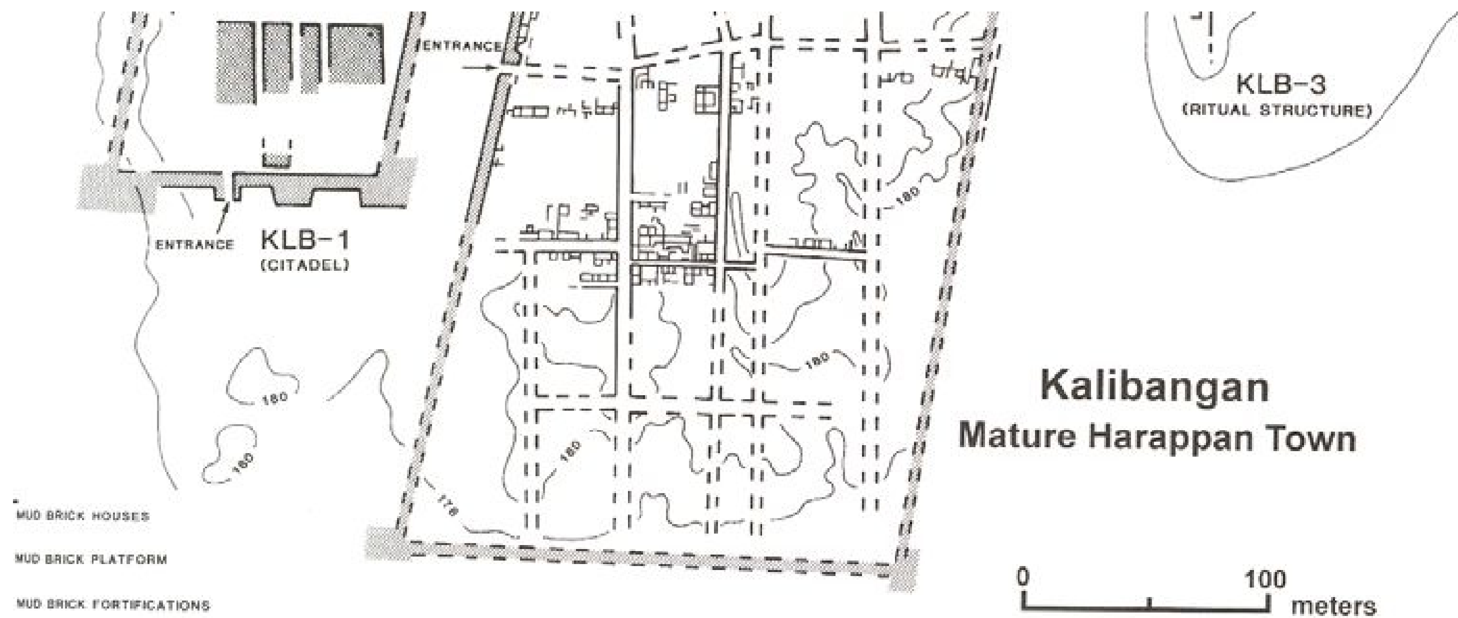
Ancient Pakistan - An Archaeological History culture. This conjecture has its support from a study on an artificially raised mound while the other levels
of walled cities in the region in the historic periods.
were on lower ground, and hence called the 'Lower
Another theory is that there were no permanent
Town'. The citadel probably contained the important
habitation outside the city-wall and that any evi
buildings of the city, like the assembly halls, relig
dence to that effect is an indicative of temporary
ious structures, granaries and in the case ofstay of the outsiders who came to city for trade.
Mohenjo-daro the famous Great Bath. The lower
They were, in effect, equivalent to '*caravansarais*' of
section of the city was where the housing for the
the medieval period in Iran, Afghanistan, Pakistan,
access. Also, Rao (28) rules out any defense funcwhich was covered by brick slabs or corbelled brick
tion for the Lothal acropolis wall which was not pro
arches, depending on its width. Like street planning,
vided with towers or guardrooms or elaborate gate
the construction of drains seems to be pre-existing
ways. At Banawali the curving eastern citadel wall
feature from the Early Indus phase. The evidence
which separated the high area from the rest of the for this is not that robust but it is there.
town had two rectangular bastions and a gateway only 1.5 m wide (29).Some common features of the Harappan cities have already been discussed in Chapter 6. and India.
inhabitants was located. The city was well con
Town Planning
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Mohenjo-daro. It is reasonable to presume that if
these have been further illustrated in Chapter 7, 8 nected with broad roads, which met at approxi

the Mound of the Great Bath had been effectively
and 9 in context of some particular urban centers. mately right angles. The houses were located in the fortified, it would have to have been fortified all the
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final analysis the city of Mohenjodaro was also a multi-suburban city, probably without
rectangular squares thus formed. city planning in general. Some degree of repetition structed for military defense, but
this theory is being case. For example, the Warehouse, a large storage inter-suburbia walls. The city of Lothal apparently consisted of three distinct townships,
Most of the large Harappan towns were
increasingly questioned. For example, it is impracti is unavoidable but it has been kept to a minimum. encompassed by elaborately designed walls with
facility of some importance, was placed on the

all three mutually integrated. As our information becomes clearer and clearer, we are We shall concentrate here on the general layout of cal to have so many separate walled areas next to western side of the mound. It is open to the Indus gateways. The Indus towns possessed no general beginning to realize that a two-tier habitation system, so far believed, may not be the
each other in Harappa, and one does not find any the Harappan cities, which essentially address the system of urban fortification and the gateways were

plains, vulnerable, and not a place that could be
norm for the Harappan Civilization. A multi-suburbs habitation pattern of cities and issue of the citadels and the lower towns. The con simple entry-points to the towns. At Surkotada and towns may in fact be closer to reality. These city suburbs may or may not have been struction of city walls around the various sectors of individually walled and not all population must be living within the city walls.





The plan of Kalibangan. The so-called Citadel is on the left and the Lower Town is on the right Pre-planned cities are the norm in the Harappan phase but it is not true in all cases and Dholavira these
evidence of damage from battles. Kesarwani (27)
gateways were quite
observed from the Lower Town. The lack of such
elaborate, not all Harappan cities are planned like Mohenjodaro or Harappa. For instance, the the city is an integral part of this subject and so is points out that
while at other towns they were very simple.
the wide north entrance without
defensive planning suggests that the gates and
urban settlements in Gujarat, such as Lothal and Surkotada, or even some of those in the the construction of raised platform to erect housing flanking guard rooms at Harappa provides easy
walls of Harappa were never intended to withstand
Indus plains itself, the sites like Kot Diji and Amri, do not show any extensive town
Some of the gateways had attached guard structures on. Street planning is also important and rooms, which wereaccess and does not appear to be suitable for keepvery small.
battle, but were more symbolic in nature and in
The
planning, notwithstanding the evidence for a general likeness with Mohenjodaro and
invariably so is the frequently discussed sewerage systems.
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Harappan fortifications were not meant to defendHarappa. Harappa was an old place by the time the Indus Civilization began, and this Indus cities are known to have made provision of
ways found at Harappa was constructed for defense was the life blood of the city. The same could be

the townships from strong attacks by enemies but would have probably constrained the would-be civic planners there. Thus, as closefresh water, some through digging of wells and catching acquires

from frontal military attack. In late historical cities,

were safety measures from robbers and cattle raiders. Themajor city gateways had a sharp turn just inside thealso provided protection fortificationsgate to expose attacker to the defenders on the top

against floods and served as the hallmark of social
Page 261ning suggests that the gates and walls of Harappa
more importance in some cities than the others.
of the gate.authority over the area they commanded.
Kesarwani suggests that the Kalibangan en
An advanced drainage system is also in
closure wall has a similar provlsion for unrestricted
evidence. Drains started from the bathrooms of the
houses and joined the main sewer in the street,261
and other Indus cities were not of defensive nature.
Multi-tier Inhabitation: From the prospecBut some archaeologists, like Ratnagar (17),
tive of town planning, the Harappan cities are char
have noted the clearly military character of the acterized by the existence of two-tier township, that
is, a higher but small mound, generally referred to
said about the north gateway of the citadel of Kali
some
through
an
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bangan. The general lack of such defensive planaspect of city planningrainwater. This
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Lower
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'granaries' or 'warehouses' at some Indus sites, stone sill of the gateway contained slots thought to

Mohenjo-daro tower system, and rectangular towers outside the city cart at a time, and immediately inside
the gate was possible occurrence of *carvansrais* have been used to hold wooden planks to close the
along the Harappa citadel wall surely also point to agates, general isolation of domestic quarters
from gate when required.a large open space where vehicles and people en

defense function. Kesarwani admits that the elaboworkshops, the existence of purely 'industrial
estering the city could be detained as required. It
The use of demarcation or defensive walls
rate south gateway at Surkotada shows provisiontates', like Chanhu-daro and several such sites
incould probably also have served as a "parking lot".around townships is an old Indus tradition,
probably for
very
closely
guarded
entry.
Here
entry
was
Cholistan, the discovery of the so-called "coolis'
originating during the 7th millennium BC in Balu

Whatever the precise function of the walls quarters" at Harappa, etc. are often quoted as evichistan as timber stockades around permanent set
gained by a short flight of steps, a right-angled turn,
dence.the mounting of a ramp, at the top of which another
and gateways, their presence made the city stand
tlements and goat pens. By the fourth millennium Most of the known and excavated Indus out from
other smaller settlements. The collective
right-angled turn gave access to a second flight of
BC, mud and stone walls replaced timber stock
evidence does not support their function as defen
sites conform to this general picture of habitation. ades. Some of these archaeological remains have
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2 m wide southsuburbs, each with its own city-wall. Thesewas neighborhoods were established at
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same culture. Characteristic styles of Flood protection is not always a satisfactorypainted ceramics,
clay figurines, inscribed
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explanation either. In all appearances, the Harap
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pans surely had defense in mind when they pro
and there is evidence for the movement of vided such massive walls for the citadels but thegoods
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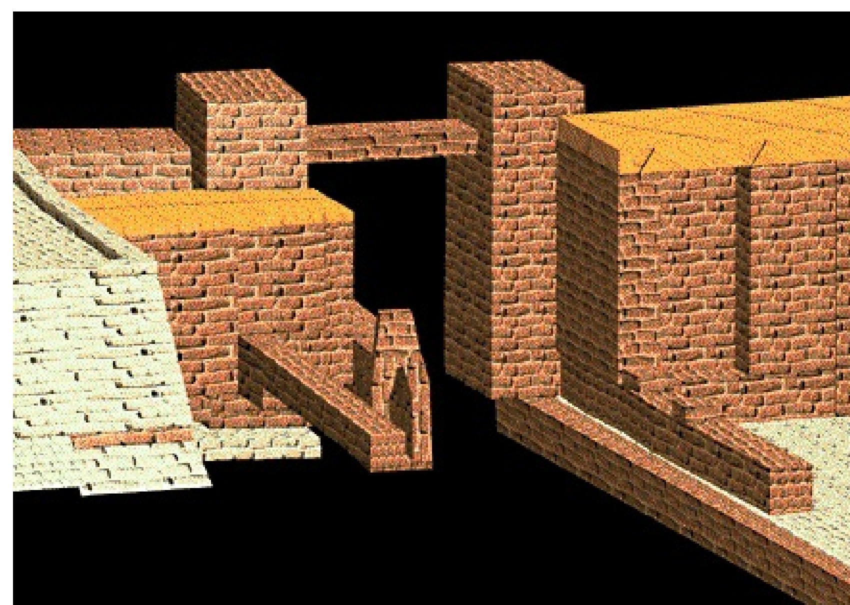
town walls did not always serve this purpose. One is a strong suspicion that in the final can hardly
believe that the citadels at Dholaviraanalysis the city of Mohenjo-daro was also and Surkotada
required massive perimeter walls inter

suburbia walls. The city of Lothal appar
for flood protection. Having said the above, it is

ently consisted of three distinct townships, very well possible that the city-wall of some cities
all three mutually integrated. The same

may have perform such a defensive or flood prosituation is apparent at Kalibangan in thetective function.Indo-Gangetic
Divide. As our information It is more probable that the citadel enclobecomes clearer, we are beginning to re

alize that a two-tier habitation system, so
sures had a social and symbolic significance in
far believed, may not be the norm for the
volving separation, exclusion and inclusion, say,
Harappan Civilization. A multi-suburbs habitation pattern of cities and towns may
call that in the large medieval urban complexes of
in fact be closer to reality. These city subsage. The elaboration of gateways, for exampleIndia and Pakistan the royal precinct was walled-in.urbs may or may not have been individually walled are at Amri (3600-3300 BC) and Kot Diji in Sindh.These precincts, with more than one palace, wereand not all population must be living within the city with the addition of stairs or ramps, seems designedThe town wall at Kohtras Buthi in Sindh Kohistan is sometimes situated outside the city and sometimes
walls. In all these elements a whole range of variarather to increase the impressiveness and solemnity
another strong evidence for the beginning of de
within the 'urban core' that also contained residen
tion exist and a broad spectrum of these features of the approach than to inhibit access or enhance
marcated settlements in the Early Harappan period.
must be assumed to characterize the cities of thedefensibility. Side chambers often flanked the gateThe pre-Indus mound at Kalibangan (3000 BC) is tial areas, marketplaces and administrative strucalso surrounded by a wall, and so are Tharo Hill
Indus Civilization. way, probably accommodating gatekeepers, whotures, and was also encircled by a periphery wall.Major Indus settleand Dhilanjo-kot in the plains of Sindh.
City Walls and Gates: could monitor the flow of people into and out of theAnother function of the walls and the gates ments were generally surrounded by massive walls,city.A strong continuity of this tradition, that is,could be the control of the trade and commerceconstructed of baked bricks, mud brick, rubble, or The city walls demonstrate the high level of which was the life blood of the culture, or they were
stone. In many cases these were retaining walls for
surrounding the settlement with a massive wall, well
architectural skills and civic control that was evident
into the Harappan phase and then into the medieval
to protect the city dwellers from outside plunders.mud brick platforms, in others they were freestandin the Indus Civilization. They are also an integral ing circuit walls, and they might be both. For exampart of the city planning at various stages of its Such city walls were rather common throughoutple, the wall around Harappa mound E was a re
central Asia, Afghanistan, Iran, Pakistan, and north
vetment in the northwest of the mound but a free
ern India in the historic times. Their primary purposestanding wall with gates around its south side. Fre
growth.
Harappa being the primary example. Such defensive or demarcation walls, with their gateways, are
'Citadels': As stated above, the remains of in fact one of the characteristic features of the Indus


Reconstruction of Mound E Gateway at Harappa Baked brick: reddish; mud brick: yellowish

Valley. Other fortified pre-urban towns found to date
was to protect the city dwellers from thieves, robquently there were bastions and sometimes towers,almost all Indus cities show two or more raised secbers, plunderers, and other unwanted people from
and there were generally a number of imposing
cities. However, not all Harappan settlements have
tions, one of which is somewhat higher than the
produced the evidence of town walls. The sites that
gateways, as described in context with the ‘citaothers. This section is commonly associated with the outside. Most of the cities in the medieval times walls are Harappa, Mohenjo-daro, Sutkagendor, Ali
dels’. were walled primarily for this purpose. It is an histhe remains of a ‘defensive wall’ and it is probably
Murad, Kalibangan, and Surkatoda.

Gates probably controlled access between here where the seat of power seemingly rested and torical truth that later societies were always threatparts of the settlement that were separately walled,
ened by outlying groups of people who were notsuch as the citadel, and the ordinary residential arwhere most of the public buildings were apparently fully integrated into the system. These ‘hill peoples’,
the ‘outcasts’ the ‘robbers’, the ‘nomads’, etc. were
never a formidable military force and could be easily
kept out of the city by a high wall and a sturdy gate.
If it was true in the historical times, it could as well
be true during the Harappan Civilization.

The city gates may also, as has been sug
gested (2), used to collect taxes or customs dues
on goods being brought into or out of the settle
ment. The large southern gateway of mound E at
Harappa, though tall and imposing, was only 2.8
meters wide, enough to allow the passage of one
located. Because of these features, Wheeler named this higher section as ‘citadel’ and this

identification

283 stuck ever since. The raised platform of the Great Bath at Mohenjo-daro is a typical ‘citadel’ of the Harappan cities and it gets frequent mention in archaeological literature of the Indus Civilization. This is a culturally loaded term, implying defense, something that is not appropriate in the Harappan context, so some scholars eschew its use. It is, however, a term hallowed in its usage in the Harappan context and provides a useful shorthand by which to refer to the elevated or separately walled mound or sector commonly found in Harappan towns and cities. It is employed in this strictly limited sense, without any inherent implications about its cultural significance.

Both at Mohenjo-daro and Harappa the citadel is a parallelogram whose buildings are laid on mud or mud-brick platforms, 6 m and l0 m high, respectively. The Mohenjo-daro citadel is just over 8 ha in size, and that at Harappa almost 11 ha. The citadel mound at Harappa is comparatively much less well known, both because it has been less excavated, and because it is more disturbed by subsequent occupation and depredation. The smaller citadel mound at Kalibangan has not yet been fully excavated, but it shows a number of corresponding features. In the southern part are brick platforms, while the northern, separated by a wall with a narrow entrance reached on either side by steps, contained ordinary houses. Both parts were approximately square and measured 120 meters along each side. The brick platforms are separated from each other by narrow brick-paved passages. While the Mohenjo-daro citadel buildings are thought to have been planned as an integrated complex, the citadel at Kalibangan was divided into two contrasting parts, separated by a wall.

Not all citadels were built on deliberately raised elevations. At Kalibangan, the citadel was built over 1.6 m of earlier, nonHarappan, habitation remains, and therefore was on higher ground than the lower city which was built on natural soil. In the southern part of the Kalibangan citadel, separate platforms were built to take ritual structures, but in the northern part, where residences were located, there were no ritual platforms (30).

At Sutkagen-dor, in Makran, a 2.5 m high platform was built against the citadel perimeter wall, and at Lothal, in Kutch, the citadel buildings were raised on a platform more than 4 m high, and built in turn over the habitation debris of phase I. At Surkotada (Gujarat) the level of the citadel was raised by 1 to 1.5 m whereas that of the lower town was raised by only 0.5 m. Mud-brick platforms at regular intervals are also known at Rakhi Garhi and the citadel mound at Dholavira is 16 m high. But at Banawali and Mitathal the citadel sections, as at Kalibangan, were relatively high only because they were built on the occupation debris of earlier times.

As at Mohenjo-daro and Harappa, so also at Kalibangan, Balakot, Sutkagen-dor, and Surkotada, the citadel lies on the west. But at Banawali the citadel section is found in the southwest part of the mound, at Mitathal it lies to the east, at Lothal it is to the southeast, and at Dholavira to the east or southeast. At some sites, the citadel area is separate from the rest of the habitation. For example, at Mohenjo-daro the citadel and lower city are separated by a space of about 150 m, possibly covered by the flow of a water channel. At Kalibangan 40 m separate the citadel from the residential town and a distance between citadel and lower town is also reported at Rakhi Garhi. At Dholavira much of the area has been put to the plough, but it is possible that a gap of about 50 m existed. But citadels are contiguous with the rest of the settlement at Harappa, and at Banawali, Sutkagen-dor, Surkotada, and Lothal.

At the same time, it is important to note that where no spatial separation exists, the citadel area is always walled in. At Harappa the citadel perimeter wall is about 12 m wide at its base, and faced with

baked brick. The high citadel portion of the Banawali mound was enclosed by a 5.4 to 7 m wide wall. A formidable wall of stone slabs, 9 m wide at



Mohenjo-daro's citadel is visible high above the modern alluvium because it is crowned by a large Buddhist stupa (relic mound) built around 200 BC. Excavation around the stupa led to the city's discovery. Hoswever, its presence means that, tantalizingly, the part of the citadel lying beneath it cannot be investigated

base, encloses the Sutkagen-dor citadel, with two massive towers in the southwest corner. At Lothal the trapezoid 'Acropolis' area shares portions of the settlement enclosure wall on its south and east. The site plan does not indicate clearly that walls separate the acropolis from the rest of the settlement to the west and north, but the two major sections reveal a brick wall along the west of the citadel, with a platform and revetment abutting it on the west. Dales (32) suggests the possibility that the Balakot 'high mound' was surrounded by a 1 m wide wall with a possible square tower on its eastern edge, and at Sotka-koh a large stone wall runs for 500 m along the eastern edge of the settlement, but this may have been a wall encircling the entire settlement. In short, at only two of the fIfteen sites investigated, Mitathal and Sotka-koh, do not lack evidence for a citadel enclosed by a wall. Mohenjodaro and Harappa were the first Harappan settlements to be investigated and seemed to set a pattern to which Kalibangan, excavated in the 1960s, appeared to conform, though already it was clear that the structures placed on the citadel varied from site to site. Later excavations have strengthened the picture of diversity. A number of other settlements also have a separate citadel mound while in some others, the separation between public and private areas is achieved by walling off one part of the area within the city's walls. Usrotada in Kutch (Gujarat), for example, is a walled settlement that is divided into two areas, the western half, the citadel, being built over a massive platform, whereas the eastern half has no such platform or it is lower than the former. The citadel at Lothal was a subdivision of the walled town.
separately walled

At Dholavira, the citadel was a block surrounded by open spaces, subdivided into two halves. Perhaps the largest of the Mature Harappan

Ganweriwala in Cholistan. Like Mohenjo-daro, Ganweriwala has a 'citadel' distinct from the main residential area but it has not yet been excavated.

In many cases the citadel was constructed over the remains of an earlier settlement. This is true, for example, of the settlements in the Divide and Kutch. This might suggest that the elevation of citadels resulted from the prior existence of a mound at the site: however, at settlements that were new foundations, including Mohenjo-daro, as well as in the settlements that had existed earlier, the construction of mud and baked brick platforms as the base for the citadel mound indicates that it was a deliberate policy to elevate citadels and the buildings they contained.

Not all citadels were constructed on an elevation, but those that were not were still clearly separated from the rest of the settlement by an imposing wall that emphasized the distinctiveness and importance of the citadel and its structures. Although the location of the citadel varied (on the west in some, including Mohenjo-daro and Harappa; on the south in Dholavira and on the southeast in Lothal), in all cases the citadel was situated on one side of the settlement rather than at its heart. These regularities suggest that citadels were intentionally created to be a part of the settlement but separate and distinct.

Some Indus settlements, of course, do not seem to have a citadel. Chanhu-daro, which is simply a set of three mounds separated from each other, is one primary example. Allahdino, a small Indus site in Sind, does not have any citadel either, although site has been completely excavated. Some settlements have more than two mounds of almost equal height. Here we do not know which one is the citadel and which one is the residential or whether there was even a citadel to start with. Finally, the presence of a citadel was not necessarily correlated with size: the five largest sites all had settlements is Harappa and citadels, but only some of medium-sized sites and a number of the smaller ones. Several very small towns also seem to have one, even if it is nothing more than a small area, more elevated than the surroundings. This consistency of the presence of citadels in most of the Indus cities tends to show that these areas were either the seats of city or state power or a place of collective ritual.

Entry to the citadel and access to its various parts were on the one hand controlled and restricted and on the other made impressive by the way the entrances and their approaches were laid out. A partially investigated structure in the southeast corner of the citadel mound at Mohenjo-daro may have provided public access to the complex at its southern end, including the Pillared Hall. The entrance combined massive brick towers with a narrow gateway, later elaborated with further towers and a raised walkway with a parapet. Atre (3) suggested that the layout of the southern complex may also have controlled the movement of people within its various parts. A gate on the western side of the citadel mound may have provided more restricted access to the Great Bath and to other structures in the north of the citadel via a substantial flight of stairs. At the top of the stairs, one passed through another gate into a bathing place where, it is thought, visitors would have been required to purify themselves before entering the sacred precinct. In the street between the Great Bath and the College, a platform of baked brick with sockets for wooden beams may be the remains of a gateway, perhaps preventing unauthorized personnel from entering the area north of the Great Bath.

Similarly, access from outside the citadel at Kalibangan was through an impressive gateway in the south, flanked by towers, now badly disturbed but probably originally with steps. From the northern portion of the citadel, entered by a simple gateway in the north wall, a path paved with mud bricks and a stair up the side of the internal wall led through a central gateway in the southern part.

The two halves of the walled town at Surkotada were connected by a passage through the internal wall. Each of the halves had a separate external entrance through the massive stone-faced mud and mud brick main town wall, that of the citadel being flanked by guardrooms. The design of the gates meant that no vehicles could enter either half of the settlement. In the final phase of occupation, the town wall was rebuilt in stone and the citadel gate was elaborated into an approach involving a stair, a ramp, and another stair.

At Harappa, Wheeler excavated two or three entrances of different dates on the west side of the citadel mound, with gates, ramps, terraces, a bastion, a guard room, and stairs or a ramp climbing to the citadel. A century earlier, Cunningham mentioned flights of stairs on both sides of the citadel. A larger gateway with a ramp provided a link in the north between mound F and the citadel.

The construction of citadels finds reflections more than 2,000 years later in the layout of the Indo-Greek cities of Pakistan, such as Taxila, where a raised citadel or acropolis contained the royal palace and important public buildings. It is also a feature of cities in many other parts of the world at various times, such as ancient Greece and several American cultures. Often, this raised area was the heart of a city’s defenses, the place of refuge for the citizens, and the location of their last stand when besieged. But perhaps more significantly, its elevation sets it apart, investing the buildings on it with special importance and often restricting access to them. Generally such structures would be public buildings of various types - temples, administrative buildings, or residence of the rulers. It therefore seems probable that those Indus settlements that had a citadel were ones that had a special importance in the civilization.

The citadels generally included some unusual buildings, which were rare in other parts of the settlement, although a few were located in the Lower Town at Mohenjo-daro and in mound F at Harappa. It is, therefore, likely that in general the citadel was the main location of official activity and public architecture. The data available are, unfortunately, quite limited and it is hard to generalize about the diverse structures found on the citadels. However, elevation, enclosure within impressive walls, and control over access seem to imply that the citadel's structures served public functions. The most comprehensively explored and published remains are from Mohenjo-daro. Other sites have a much more restricted range of structures or they have not been explored or published in much detail.

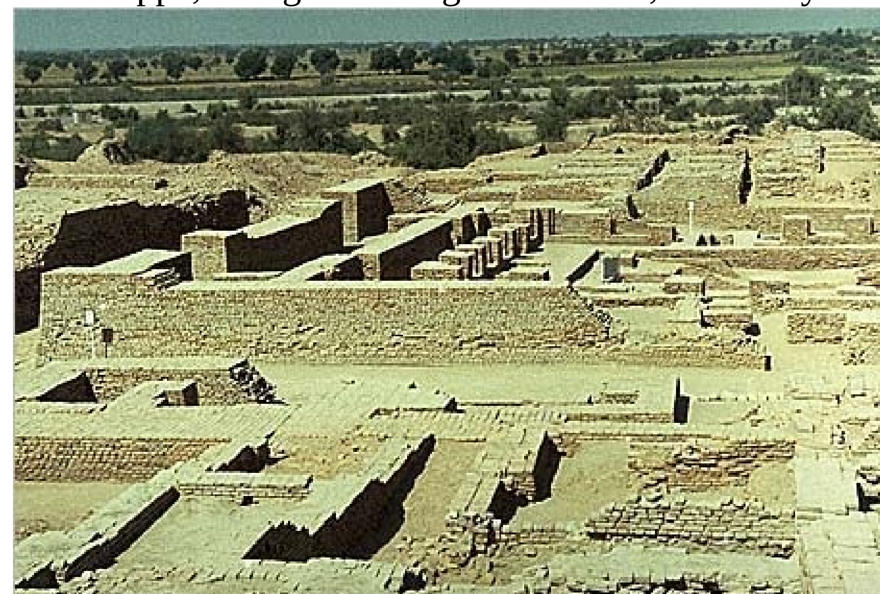
A few structures have been identified as religious installations, in particular the Great Bath at Mohenjo-daro and the platforms in the southern citadel at Kalibangan. A large reservoir and a rainwater collection system were uncovered on the citadel at Dholavira. In view of the strong link between water and Harappan ideology, these were perhaps related to religious practices. Large buildings are reported to have been uncovered in parts of the Dholavira citadel but published details are lacking. A large area in the northeast of the Mohenjo-daro citadel lies beneath the later Buddhist stupa, so it has not been excavated; however, architectural remains around its edge indicate that major buildings existed there. Much of the southern part of the mound was taken up by a large complex that included the Pillared Hall and perhaps a shrine; this complex seems to have had both public and residential areas. Residential buildings form a significant proportion of the structures found in all the excavated citadels; some were no different from the houses in the associated lower town, while others seem designed to accommodate large numbers of people. Although structural remains have not demonstrated unequivocally that the citadels were the main location of public activities and the center of administration and government, they are at least consistent with such an interpretation.

Buildings identified as substantial storage facilities have been uncovered on the citadels of several settlements. Adjacent to the Great Bath in the northern part of the Mohenjo-daro citadel is a building that Wheeler thought to have been a granary, orientated east-west. A 6-meter-wide baked brick "loading platform" ran along the north side; this had many sockets for timbers, presumably supporting a roof. Toward the west end was a verticalsided bay, which Wheeler interpreted as the place where bales were hauled up. The granary behind was a rectangular platform, 50 meters east-west by 33 meters north-south, bearing three rows of nine brick podia 1.5 meters high, separated by passages around 80 centimeters wide. The southern and central eastern blocks revealed rows of sockets that had held wooden timbers. Wheeler thought these had supported a ramp or flight of stairs, whereas Jansen suggested that each of these podia was covered by a light roof. Alternatively, the whole building may have had a massive wooden superstructure. Doubts have been cast on the building's interpretation as a granary since no grain was found during its excavation.

However, the Granary bears some similarities to the building at Lothal whose associated finds support an interpretation as a warehouse. The Lothal warehouse was constructed on a raised mud brick platform, with sixty-four mud brick blocks of which twelve have been uncovered. The building probably originally had a light superstructure. The finds from the building included numerous seals and sealings from bales of goods that had been packed in reeds, woven cloth, and matting. Storage facilities were provided in other settlements also. A granary with barley in one of its compartments was reported from the citadel at Rakhigarhi. Some of the buildings at Chanhu-daro may have been warehouses. In the walled sector at Gola Dhoro, there were a number of clay-lined storage bins, some containing large quantities of jasper from Saurashtra. Whereas beads were made from the mottled jasper stored in these bins, larger pieces of a colored variegated jasper was not used at Gola Dhoro but stored for onward distribution.

The tiny settlement of Allahdino did not have a separate citadel (or it was all citadel), but its layout and buildings suggest that it fulfilled an administrative role. The north wing of the largest building had several chambers containing pottery storage vessels, and a separate smaller structure contained others. Sunken storage jars were found in some of the rooms in a large complex on the citadel at Balakot. The walled area at Kuntasi included a number of rooms used for storage, some with jars and clay bins, others themselves containers (strong rooms). These were similar to domestic storage facilities, for example in the houses at Banawali.

At Harappa, a large building in mound F, which lay between the river and the citadel, was



A view of the ‘Citadel’ area. Note the wide streets intersecting

somewhat narrower streets at **A view of the 'Citadel' area at Mohenjo-daro. Note the wide streets intersecting some**
what narrower streets at right angle.
intersecting somewhat narrower streets at right angle Some Indus settlements, of course, do not seem to have a citadel. Chanhu-daro, which is

originally identified as a granary. A large mud brick plinth supported a series of twelve compartments, arranged in two rows of six, provided with sleeper walls to allow air to circulate beneath the floor. A wooden superstructure must originally have stood above this, probably a series of separate rooms or halls, each accessed from the central passage by

of domination. But independent successor states
less well known, both because it has been less Banawali and Mitathal the citadel sections, as at

means of a stair, and separated from each other by excavated, and because it is more disturbed by are hard to imagine in an environment like the MakKalibangan, were relatively high only because they narrow passages. The identification as a granary subsequent occupationran and Gujarat.depredation. The were built on the occupation debris of earlier times.

was largely based on its perceived resemblance to
smaller citadel mound at Kalibangan has not yet The larger portion of theAs at Mohenjo-daro and Harappa, so also at **TheLowerTowns:** Kalibangan, Balakot, Sutkagen-dor, and Surkotada,Roman grain stores; grain, however, was conspicubeen fully excavated, but it shows a number of corIndus cities was the so called Lower Town, so called ously absent among the finds from the building. It
responding features. In the southern part are brick the citadel lies on the west. But at Banawali the because it was built, generally but not always, at acitadel section is found in the southwest part of themay have been used to store other goods and maplatforms, while the northern, separated by a wall
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clues to its function, but the team suggests that itfrom each other by narrow brick-paved passages.
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Mohenjo-daro citadel buildings are rated by a space of about 150 m, possibly covered
suburbs but it is not known if all of them wereby the flow of a water channel. At Kalibangan 40 m than a storage facility (16). thought to have been planned as an integrated

complex, the citadel at Kalibangan was divided into Town Planning ! walled. Taking our cue from medieval walled cities separate the citadel from the residential town and a Ancient Pakistan - An Archaeological History The residential area on the citadel at Lothal
two contrasting parts, separated by a wall.in the region, it is likely that the suburbs developeddistance between citadel and lower town is also chambers containing pottery storage vessels, and acluding courtyards and unusual architectural features
includes twelve bathing platforms attached to a
Not
all
Perhaps the largest of the Mature Harappan settlements is Ganweriwala in Chilistan. reported at Rakhi Garhi. At Dholavira much of the gradually as the area within the city walls becamesuch as a patterned floor.
large drain that may have belonged to a row of sin
Like Harappa and Mohenjodaro, Ganweriwala has a 'citadel' distinct from the mainarea has been put to the plough, but it is possible
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Harappa, and at Banawali, Sutkagen-dor, Surkotor, S. R. Rao, suggested was the ruler's house. A some with jars and clay bins, others themselves conas a commercial and residential hub. Surprisingly,assigned a role of religious rituals or public ceremonies.Surkotada in Gujarat, for example is a walled settlement that is divided into two areas,
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apart from residence. to the west and north, but the Citadels have also been portrayed two major sections as center of power. According to these brick wall along the west of the opinions, citadels were the mark of imcitadel, with a platform and reposed political rule backed by the use vetment abutting it on the west. or threat of force. Wheeler's imagery of Dales (32) suggests the possibility thatthe 'high-built citadels' 'frowning upon their cities with a hint of alien domina

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At Harappa, a large building in mound F, which edge, and at Sotka-koh a large stone wall runs for citadel sites could represent the
emer simply a set of three mounds separated from each other, is one primary example. gence of small and independent seats of power, at safe

pendent seats of power, at safe distance from the core zone, when the Harappan state(s) or ruling house(s) branched out and fissioned or disintegrated into smaller units, and some ambitious indi

Harappan Civilization - The material culture viduals cast off their ties with the center and built their own centers in emulation of the central seats
floor.

There is no answer to the question: why a separate and higher section of the settlement? In the

foregoing discussion, citadels have implicitly or indirectly been assigned a role of religious rituals or public ceremonies. But it appears that the ceremonial function of the citadels has been unduly exaggerated in archaeological literature. It assumes the existence of an organized Rantagar probably did not exist in the Harappan society. Religious beliefs based on superstition, witchcraft, and shamanic practices do not call for elaborate public ceremonies. Furthermore, at some of the smaller sites the citadel can occupy one-third to half of the built-up area, too large a proportion, surely, for ceremonial alone. Ceremonial activities within citadel walls are attested at Mohenjo-daro, where the Great Bath is thought to serve a ceremonial function,

but they are not indicated anywhere else. Furtherlay between the river and the citadel, was originally 500 m along the eastern edge of the settlement, but
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intervals are also known at Rakhi Garhi and thewhere visiting merchants would have been accomHarappanto imagine in an environment like the Makran and Guto be investigated central passage by means of a stair, and separated settlements jarat. seemed to set a pattern to which Kalibangan, excabuilt citadels' 'frowning upon their cities with a hintfrom each other by narrow passages. The identificationmodated. These open spaces are generally outside
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conspicuously absent among the finds from the buildwere always accessodated outside the town and cause it was built, generally but not always, at a lower ing. It may have been used to store other goods andwere not allowed into the settlement at night. height than that of the citadel. This sector is believed to

materials, though there is no report of sealings or other
remains that might support this. Recent reinvestigation
by the HARP team has not uncovered any new clues to
its function, but the team suggests that it may have
been a palace or public building rather than a storage

facility (16).
be the habitation areas for the general public and a center of craft and trade activities.

At Harappa there were several separate walled areas. At Mohenjodaro also were several suburbs but it is not known if all of them were walled. Taking our cue

from medieval walled cities in the region, it is likely that
religion, which, according to (see the next volume) most

Platforms: Massive platform emerged during the Harappan period as one of the fundamental architectural principles on which the cities were built. The use of a platform was, however, not a unique feature of the Mature Harappan Civilization; its use was common even in the Early Indus period in Baluchistan and Sindh. Several examples of such platforms, although of smaller sizes, have been found and documented (12). A number of settlements, including Mohenjo-daro, Harappa, Chanhudaro, Lothal, and Banawali, were wholly or partly founded on artificial platforms made of mud brick, earth, and rubble with substantial retaining walls, which gave some protection against flooding. These required enormous amounts of materials, time, and labor (calculated at around 4 million man-days for Mohenjo-daro) and were therefore possible only where sufficient manpower could be deployed and the necessary organization existed. Flood damage has been reported at several Harappan sites, including Chanhu-daro and Lothal, confirming that flooding was a hazard endured by settlements located in the floodplains and in some other areas such as the Nal Depression. Jansen has demonstrated that the platforms at Mohenjo-daro, more than 6 meters high, raised the city above any possible floodwaters

The importance, purpose, and significance of the platforms in Mature Indus period can be better elucidated through the examination of Mohenjo-daro. The city was designed in part as a settlement on the floodplain of a tremendously powerful, violent river. Serious flooding of the Indus River in historical times has been recorded every five to seven years. The solution to this problem at Mohenjo-daro was to build platforms to raise the buildings and streets above the flood levels just as the early platforms were foundation structures that substantially raised the settlement above the flash floods.

A typical raised platform of the Indus Civilization is the Mound of the Great Bath at Mohenjodaro, which is manmade and built on Indus alluvium. To contain the earthen fill and inhibit erosion, the builders of the Mound of the Great Bath put a retaining wall around their "hill." This helped to keep

everything in place. It also defined the Mound of the Great Bath architecturally. One important reasons for raising platforms could be the perennial problem of rising water table and the corrosion caused by salt deposits on the foundation of building.

Platforms were not raised for building construction on them alone. In some parts of Mohenjodaro and Kalibangan, brick platforms stood outside the houses. These may have been places for people to sit and talk, like the village chowk in the rural areas of present-day Pakistan.

Streets Layout: A remarkable feature of the large urban settlements of the Harappan Civilization is the regularity of street layouts. The northsouth alignment of long thoroughfares at such an early period is unparalleled in history. Such a concept of planned ‘boulevards’ and streets is also confirmed by a straight alignment of house walls along the streets. This type of street planning and the high sense of sanitation and strict observance of the rules of regularity suggest a community of people who were certainly disciplinary and punctilious in their behavior patterns at least during the mature phase of the Harappan Civilization.

Straight, cardinally orientated, main streets generally divided Harappan towns and cities into rectangular residential blocks. The impression of the early excavators at Mohenjo-daro, reinforced by excavations at Harappa and Kalibangan, was that settlements were laid out in a checkerboardlike grid pattern and this claim has been repeated over and over again in the archaeological literature. Recent research has, however, questioned the significance, or even the existence, of such a ‘gridiron layout’. They point out that there is no actual proof for the famous 'grid pattern'. According to them, only the north-south axis of First Street is evident at Mohenjo-daro. The second axis to the east is not proved, all other streets turn corners and do not fit into a 'gridiron lay-out'. Indeed, a review of published excavation plans reveals that the vast majority of the gridiron layout at Harappan sites is represented by dotted lines through un-excavated areas rather than the solid lines of actually excavated streets. A Monhenjo-daro street with drain along the side of the thoroughfare of a gridiron street plan has probably influenced the placing of these "dotted line" streets through unexcavated areas. According to these opinions, the existence of a cultural norm prescribing the orientation of all buildings according to the cardinal directions would of itself produce a superficial "gridiron pattern," without the existence of centralized authority or a developed sense of town planning. One cannot help questioning as to what extent the presumed right-angle street pattern is valid on archaeological grounds.

Such a criticism may be valid if not carried too far to become absurd. It would certainly be worthwhile to re-examine the available data to see if alternative explanations may be proposed. Till then, one must be satisfied in assuming that the dotted lines are the result of thoughtful thinking of a great number of prominent archaeologists and not figment of imagination of any single individual. These ‘dotteds lines’ represent a consensus of a large number of excavators over a long period of time.

Still, we should be on guard and see clearly that only Mohenjo-daro, and to some extent Harappa and Kalibangan, is the only Indus city where an extensive street planning is in evidence. At other places, the tendency for grid layout of streets is in evidence but we cannot say that these cities were ‘planned’ in the sense Mohenjo-daro was. Some Indian archaeologists tend to read more in the ruins of Lothal, Kalibangan, Banawali, and others than what there actually is. Similarly, the western scholars have a tendency to generalize the town planning of Mohenjo-daro and Harappa to all

Harappan Civilization - The Material CultureHarappan Civilization - The material culture

the cities of the Indus Civilization. Each city was different, some planned, some rudimentarily sion crosses First Street at a right angle and is very likely to have been a major thoroughfare. In fact it

planned, and some not planned at all.ture of cities in many other parts of the world athas been called 'East Street' and on the north it is A few structures have been identified as relig
Whether the indus cities, even Mohenjo-daro
various times, such as ancient Greece and severalfronted by 3 to 6 m high platforms carrying theious installations, in particular the Great Bath at by itself, were laid out on a gridiron plan or not, can houses of the VS area. Mohenjo-daro and the platforms in the southernAmerican cultures. Often, this raised area was the Within the excavated blocks smaller streets,be argued either way and we shall not indulge here
heart of a city's defenses, the place of refuge for theAncient Pakistan - An Archaeological Historycitadel at Kalibangan. A large reservoir and a rain
in such a hair-splitting discussion at this time. Inapproximately parallel to First Street, are also ex
citizens, and the location of their last stand when water collection system were uncovered on the stead, we shall be content to note that the street posed: e.g., West Street in DK-G, and two streets in

Mohenjo-daro was. Some Indian archaeologists tend to besieged. But perhaps more significantly, its elevaHR-B. The latter two sidecitadel at Dholavira. In view of the strong link belayout was generally planned and it was governed streets do not, however,
read more in the ruins of Lothal, Kalibangan, Banawali, tion sets it apart, investing the buildings on it with about 9 m wide and named 'First Street', was exposed tween water and Harappan ideology, these were

by precise criteria, leading to a generalized gridiron continue north into VS, which was clearly a sepa and others than what there actually is. Similarly, the special importance and often restricting access to in the DK-G area excavations. The same street align perhaps related to religious practices. Large build

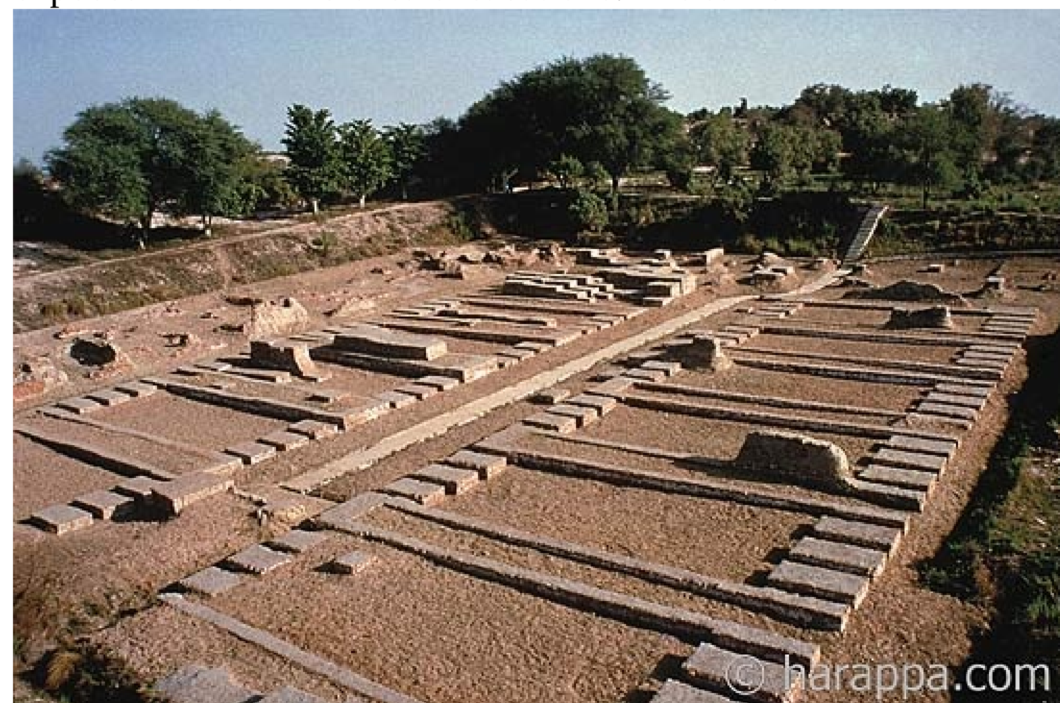
plan. We must clarify at the outset, however, that rate block. More important, in the area excavated by them. Generally such structures would be public ment can be picked up further south in the VS area, andings are reported to have been uncovered in parts
neither at Mohenjo-daro nor at any other Mature Dales on the western edge of HR, runs a major

town planning of Mohenjo-daro and Harappa to all thebuildings of various types - temples, administrative street, about 8 m wide, parallel to First Street and of the Dholavira citadel but published details are Harappan settlement do we have a base grid of the
cities of the Indus Civilization. Each city was different,
accuracy or symmetric squares of a Roman town.buildings, or residence of the rulers. It therefore lacking. A largepossibly also an arterial thoroughfare, though its in the northeast of
wide depression today cuts the lower city between the the some planned, some rudimentarily planned, and some length has been traced for less than 200 m. 50 m contours. This depression crosses First Street at a
Instead, there are systems of wide streets running seems probable that those Indus settlements that Mohenjo-daro citadel lies beneath the later Buddhist
not planned at all. down the lengths of habitation areas, not perfectly
had a citadel were ones that had a special impor
Whether the indus cities, even Mohenjo-daro by

right angle and is very likely to have been a major thor
East of First Street, also running north-south,stupa, so it has not been excavated; however, archioughfare. In fact it has been called 'East Street' and on
tance in the civilization.parallel with one another, and intersected by narlies a street crossing the DK-area in the northeasttectural remains around its edge indicate that major itself, were laid out on a gridiron plan or not, can be arthe north it is fronted by 3 to 6 m high platforms carrying rower streets, usually at right angles but in a stagThe citadels generally included some unusualern part of the city. Though traced for only about 55

gued either way and we shall not indulge here in such a the houses of the VS area.buildings existed there. Much of the southern part of gered manner (so that there are few square juncm, this street is also approximately 9 m wide, and
hair-splitting discussion at this time. Instead, we shallbuildings, which were rare in other parts of the setthe mound was taken up by a large complex that tions), and with the side streets often dog-legged. runs northeast to southwest (rather than exactly
be content to note that the street layout was generally tlement, although a few were located in the Lower proximately parallel to First Street, are also exposed:included the Pillared Hall and perhaps a shrine; this

What we do have, then, is the division of habitation north-south), just as First Street does. It could have
planned and it was governed by precise criteria, leadingTown at Mohenjo-daro and in mound F at Harappa.been e.g., West Street in DK-G, and two streets in HR-B. The complex seems to have had both public and resi
areas into roughly rectangular blocks, each of whichWe must clarify at the latter two sidelongitudinalstreets do not, however, continue north
to a generalized gridiron plan.It is, therefore, likely that in general the citadel was Meanwhile, an equally wide east-west street cuts dential areas. Residential buildings form a signifi contains several houses.
exposed in the DK-G area excavations. The same



The so-called "granary" of Harappa is found on Mound F. It is a brick structure

The so-called "granary" of Harappa is found on Mound F. It is a brick structure **(capped) that was built on a massive brick foundation over 45 meters north south and 45 east-west. Two rows of six rooms that appear to be foundations are arranged along a cen**
meters east-west. Two rows of six rooms that appear to be foundations are arranged

tral passageway that is about 7 meters wide and partly paved with baked bricks. Each along a central passageway that is about 7 meters wide and partly paved with room measures 15.2 by 6.1 meters and has three sleeper walls with air space between baked bricks. Each room measures 15.2 by 6.1 meters and has three sleeper walls

them. A wooden superstructure supported in some places by large columns would have with air space between them. A wooden superstructure supported in some places by been built on top of the brick foundations, with stairs leading up from the central passage

large columns would have been built on top of the brick foundations, with stairs area. Small triangular opening may have served as air ducts to allow the flow of fresh air leading up from the central passage area. Small triangular opening may have beneath the hollow floors.
served as air ducts to allow the flow of fresh air beneath the hollow floors
AtMohenjo-daroanarterialnorth-south

into VS, which was clearly a sepacant proportion of the structures rate block. More important, in the found in all the excavated citadels;

area excavated by Dales on the
some were no different from the East western edge of HR, runs a major houses
Street.theWethus in associatedstreet, about 8 m wide, parallel tolower
know of five arterial
town, while others seem designed First Street and possibly also an
to accommodate large numbers of people.
three along its length andstructural length has been traced for less reapproximately equidistant demonstrated
mainsthan 200 m.haveanother,not and
from one
unequivocallyEast of First Street, also run
two lateral. Though only thatliesthe citadels
were the main location of public a street two of them can be traced
activities and the center of admini
eastern part of the city. Though stration and government, they are
traced for only about 55 m, this
at least consistent with such an
street is also approximately 9 m
interpretation.runs northeast to wide, andAlso, from Jansen's southwest
Buildings identified as (rather than exactly
substantial storage facilities have
area, we can tell that sidedoes. It could have been the third been uncovered on the citadels of
streets, traced for 60 to
several
longitudinal arterial thoroughfare. settlements. Adjacent to

66 m, both north-south the Great Bath in the northern part
and east-west, formed the
of the Mohenjo-daro citadel is a

perimeters of five blocks.
area and may be the second maWithinlateral street, northbuilding that Wheeler thought to

jorhave been a granary, orientatedof East Street. We thus know of five arte
or expanded in the courseeast-west. A 6-meter-wide baked of
rial streets in Mohenjo-daro, three
brick "loading platform" ran alongalong its length and approximately the

north side;street frontages remainedhad equidistant from one another, andmany constant. The consistency o fsocketstwo lateral. Though only two ofpresumably a l i g n m e n t s

supporting a roof. Toward the west
through the history of
endble lengths, they are also paralvertical-sided bay,Mohenjo-daroleled by side streets in the DK and
which Wheeler interpreted as the
cant, but we must not ex
placeHR areas.where bales were hauledaggerate the significance:
as a general rule street layout is the most conservaup. The granary behind was a rec
the Moneer area, we can tell that
street, about 9 m wide and named 'First Street', was
any other Mature Harappan settlement do we have a
tecture. The data available are, unfortunately, quiterebuilt or put to different uses, it is not practical to
outset, however, that neither at Mohenjo-daro nor atthe main location of official activity and public architive aspect of a
townscape. While buildings can betangular platform, 50 meters east-west by 33 me
side streets, traced for 60 to 66 m, both north-south and
ters north-south, bearing three rows of nine brick
base grid of the accuracy or symmetric squares of a
street alignment can be picked up further south in
Roman town. Instead, there are systems of wide streets limited and it is hard to generalize about the diverse
east-west, formed the perimeters of five blocks. Within podia 1.5change the alignment of streets in a densely builthigh,
separated by passages each block the buildings could be altered or expanded the VS area, and then even further south in the HR
space (17), especially in a city like Mohenjo-daroaround 80 centimeters wide. The southern and
cenrunning down the lengths of habitation areas, not perstructures found on the citadels. However, elevain the course of rebuilding, but their street frontages
area. North of HR, a wide depression today cuts the
fectly parallel with one another, and intersected by nartion, enclosure within impressive walls, and control
lower city between the 50 m contours. This depres
rower streets, usually at right angles but in a staggered268
manner (so that there are few square junctions), andThe most compre
with the side streets often dog-legged. What we do
hensively explored and published remains are from
have, then, is the division of habitationareas intoMohenjo-daro. Other sites have a much more re
roughly rectangular blocks, each of which contains sev
stricted range of structures or they have not been
remained constant. The consistency of street aligntral eastern blocks revealed rows of sockets that

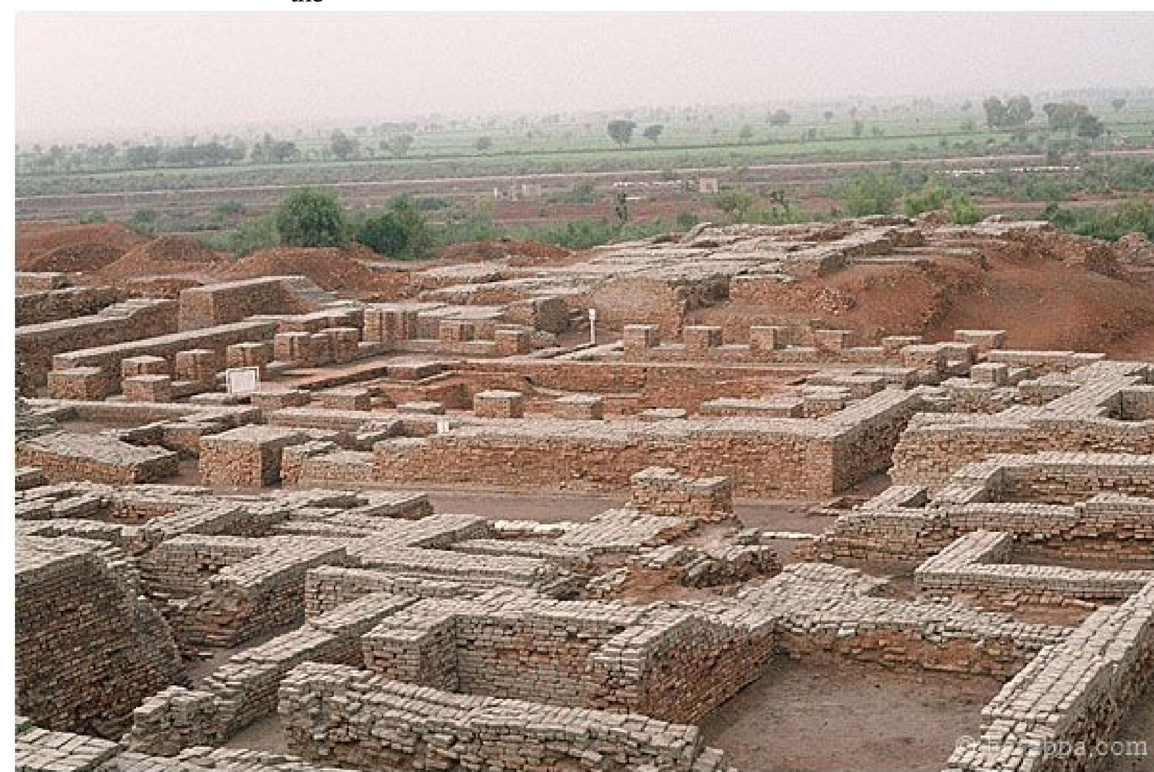
ments through the history of Mohenjo-daro is signifi
had held wooden timbers. Wheeler thought these
cant, but we must not exaggerate the significance: as a
tures served public functions. had supported a ramp or flight of stairs, whereas
general rule street layout is the most conservative as
Jansen suggested that each of these podia was
pect of a townscape. While buildings can be rebuilt or
covered by a light roof. Alternatively, the whole put to different uses, it is not practical to change the
building may have had a massive wooden super
interpretation as a granary since no grain was found during its excavation.

However, the Granary bears some similarities These were similar to domestic storage facilities, for example in the houses at Banawali.

At Harappa, a large building in mound F, to the building at Lothal whose associated finds Harappan Civilization - The Material Culturewhich lay between the river and the citadel, was support an interpretation as a Ancient Pakistan - An Archaeological Historyoriginally identified as a granary. A large mud brick

cially in a city like Mohenjo-daro where most buildingplinth supported a series of twelve
compartments,or at right angles to one another. 'Some attention had blocks were raised over high
platforms.where most building-blocks were raised over higharranged in two rows of six, provided
with sleeper to one another. 'Some attention had been paid to
platforms.A grid in the Kalibangan lower town layout also walls to allow air to circulate beneath the
floor. A F.A.Khan (21) referred to a 'well-regulated town appears certain (18). Four north-south, and three east
town-planning' in Harappa II levels'. plan' at Kot Diji but this is not clear from the plan of the A grid in the Kalibangan lower town layout F.A.Khan (21) referred to a 'well-regulatedwest streets have been located
which divide the area 'Citadel', and no plan of area B, the 'lower city', has
also appears certain (18). Four north-south, and town plan' at Kot Diji but this is not clear from the
into rectangular blocks, while smaller lanes taking off been given. The plan of the Mature Harappan buildings
from these on both sides are staggered on plan. The
three east-west streets have been located which
in the western (higher) part of the Balakot mound
means of a stair, and separated from each other by plan of the 'Citadel', and no plan of area B, the
were provided in other settlements also. A granary longitudinal streets are not parallel all the way, and neiblocks,
with barley in one of its compartments was reported
ther are they parallel to the fortification walls. Through
veals (22) an east-west lane being met by two narrower
whilenarrow passages. The identification as a granary
rectangular 'lower city', has been given. The plan of the Mature
lanes, at approximately right angles, from the south. smaller lanes taking off from these on both sides
Harappan buildings in the western (higher) part of the eight to ten building phases (amountingto some 10
are staggered on plan. The longitudinal streets are
blocks of buildings. B.K Thapar observes that streetnot parallel all the way, and neither are they
parallelRao (13) the residential area of Lothal was divided into

Roman grain stores; grain, however, was conspicureveals (22) an east-west lane
m of debris) these streets provided the grid for the streets would have to be traced to prove it. According to
ings at Chanhu-daro may have been warehouses. being met by two narrower lanes, at approximately
In the walled sector at Gola Dhoro, there were a may have been used to store other goods and ma
widths are multiples of 1.8 m. (18)
to the fortification walls. Through the eight to ten
rectangular blocks by side streets and lanes, which in
terials, though there is no report of sealings or other right angles, from the south. There was apparently
large quantities of jasper from Saurashtra. Whereas At Mitathal II A the settlement 'appears to be remains that might support this. Recent reinvestigaturn formed larger blocks between arterial streets. In
building phases (amountingto some 10 m of debris) a grid here, but many more streets would have to plannedbeads were made from the mottled jasper stored innorthblock B in the Acropolis the grid of narrow streets is these streets provided the grid for the blocks ofclear (13).be traced to prove it. According to Rao (13) the south', there are staggered junctions as at Kalibangan, clues to its function, but the team suggests that itbuildings. B.K Thapar observes that street widths residential area of Lothal was divided into rectangu
and widths vary between 1 m and l.7 m (20). No site may have been a palace or public building rather At Dholavira, a straight main street ran west to are multiples of 1.8 m. (18)
plan for level II A, however, appears in the report. Bisht than a storage facility (16).lar blocks by side streets and lanes, which in turn Theformedresidentiallargergate into the Lower Town, where it blocks between arterial thetook a more crooked course. The



The Great Bath is situated along a north-south street with a drain covered with limestone blocks. In the background is the so-called Granary, while in the foreground are the walls of

The Great Bath (across the street) is situated along a north-south street

several domestic structures

with a drain covered with limestone blocks. In the background is the so called Granary, while in the foreground are the walls of several domestic

citadel at Lothal instreets. In block B in the Acropolis thecludes twelve bathing platmain streets were often broad; for
grid of narrow streets is clear (13).
forms attached to a largeinstance, First Street in Mohenjo

At Dholavira, a straight main street ran
drain that may have bedaro was 9 meters wide. Narrow
laneslonged to a row of single- west to east through the Middle Town
streets often followed a crooked
roomedand continued through a gate into the
the architectural detail is course; Wheeler suggested that
Lower Town, where it took a more uncertain. Nearby was athis dog-leg arrangement would
crooked course. The main streets were
have broken the force of the prebuilding that the excava
vailing wind. As in many modernoften broad; for instance, First Street in
tor, S. R. Rao, suggested
was the ruler's house. A Pakistani settlements, access toMohenjo-daro was 9 meters wide. Nar large
complex wasthe houses was from these lanes,par off the principal tiallyavoidinglanes dust running
uncovered onof **the** main streets often followed a crooked course;
citadel at Balakot, includthoroughfares, where the houses
ingthat courtyardsthem andpresented only Wheeler suggested that this dog-leg ar
usualblank walls.architecturalrangement would have broken the force tures such as a patternedof the prevailing wind. As in many mod
floor.
such as Surkotada, where there
ern Pakistani settlements, access to the
is no suggestion of a grid. Of houses was from these lanes, avoiding
tocourse, for reasons given below,
the
question:
dust of

why a thoroughfares, we would not expect all Harap tion of the settlement? Inpanwhere the houses that lined them pre

the
built on a grid plan. What is of
sented only blank walls.
citadels have implicitly or interest is that the grid plan is not
There are a few small sites, such as indirectly been assigned aconfined to the largest Harappan
Surkotada, where there is no suggestion
towns, but is also attested at a role of religious rituals or
of a grid. Of course, for reasons given
public ceremonies. But it The tiny settlement of Allahdino did not have
(19) found that at Banawali three major streets, about**structures** a separate citadel (or it was all citadel), but its lay
5.4 m wide, cross the lower city, parallel to one another
out and buildings suggest that it fulfilled an adminisand following the alignment of the city walls. Single
trative role. The north wing of the largest building
rows of houses form blocks between each two streets.At Mitathal II A the settlement 'appears to
bescrappy and often unreliable. For example, Rao (13) plan. What is of interest is that the grid This is not a grid of

rectangular blocks, and streets are plan is not confined to the largest Harappan towns, planned with streets oriented
east-west and northstates that a central arterial street at Lothal is 40 ft (12 not always straight; often streets do not meet at right pan
society. Religious beliefs based on superstition,but is also attested at a medium size settlement like south', there are staggered junctions as at Kaliban
angles. But the published plan nevertheless indicates a
the rooms in a large complex on the citadel at Bala witchcraft, and shamanic practices do not call for Kalibangan, and, if confirmed, even at a 2.8 ha set
gan, and widths vary between 1 m and l.7 m (20).
kind of grid, maintained over a period of accumulation elaborate public ceremonies. Furthermore, at somethis street wider than the widest streets at Mohenjoof more than 4 m of building debris (17).kot. The walled area at Kuntasi included a number tlement like Balakot. No
site plan for level II A, however, appears in the
The house plans of Mound II, second Harappa daro. Occasionally an excavator mentions a chessData on Mature Harappan settlement layouts of rooms used for storage, some with jars and clay of the smaller sites the citadel can occupy one-third
report. Bisht (19) found that at Banawali three major
board layout but presents no site plan as corroborative
to half of the built-up area, too large a proportion,
level, at Chanhu-daro do not reveal a clear grid beevidence. Inis scrappy and often unreliable. For example, Raolarge settlements
some surely, for ceremonial alone. Ceremonial activities
cause of subsequent destructions of house walls. But
entire street streets, about 5.4 m wide, cross the lower city, par lengths could not be excavated, but alignments
have(13) states that a central arterial street at Lothal is allel to one another and following the alignment of been connected up on plans to show probable street
Mackay was able to trace the carefully laid brick drains 40 ft (12 m) wide, but the site plan does not revealto plan the orientations of the streets and could infer thethe city walls. Single rows of houses form blocks courses. At other excavated sites, either the small
ex presence of wider and narrower streets, running parallelbetween each two streets. This is not a grid of rec290 any continuous street alignment of such a width, tent of the excavated area or destruction of Harappan
tangular blocks, and streets are not always straight;
which would make this street wider than the widest
buildings in later periods prevent us from confirming or

often streets do not meet at right angles. But the
published plan nevertheless indicates a kind of grid,[262]
maintained over a period of accumulation of more
than 4 m of building debris (17).

ThehouseplansofMoundII,second
Harappa level, at Chanhu-daro do not reveal a clear
grid because of subsequent destructions of house
walls. But Mackay was able to trace the carefully
laid brick drains to plan the orientations of the
streets and could infer the presence of wider and
narrower streets, running parallel or at right angles
streets at Mohenjo-daro. Occasionally an excavator mentions a chess-board layout but presents no site plan as corroborative evidence. In some large settlements entire street lengths could not be excavated,

but alignments have been connected up on plans to show probable street courses. At other excavated sites, either the small extent of the excavated area or destruction of Harappan buildings in later periods prevent us from confirming or denying the existence of a grid plan. At the same time there seems little justification for recent attempts to dismiss the evidence of grid plans altogether.

bangan, and, if confirmed, even at a 2.8 ha settlement
appears that the ceremonial function of the citadels
like Balakot. below, we would not expect all Harappan has been unduly exaggerated in archaeological litsettlements to have been built on a grid
erature. It assumes the existence of an organizedData on Mature Harappan settlement layouts is
Harappan Civilization - The Material Culture

The best example of manifest street planning is found at Mohenjo-daro but Harappa, Kalibangan, Kot Diji, Naushahro, Lothal, and a few other sites also provide good evidence for this practice. It may Harappan Civilization - The material culturehouses in certain direction appears to be a definite appear strange that it was not the citadel but only
the lower city that was constructed on a grid plan of

parallel streets, wide as well as narrow. The reason
within citadel walls are attested at Mohenjo-daro,

could be that the entire citadel was one integrated
where the Great Bath is thought to serve a ceremo
unit, and that its several buildings were functionally
nial function, but they are not indicated anywhere

interrelated.else. Furthermore, public ritual could not have been

Why Street Planning: Was the gridion street
the activity apart from residence.
planning a function of the use of wheeled traffic in
Citadels have also been portrayed as center

side the larger Harappan towns? Was it to facilitate
of power. According to these opinions, citadels were
the flow of fresh air through the city? Or, was it a
the mark of imposed political rule backed by the use
necessity to institutionalize the city’s sewerage sys
or threat of force. Wheeler's imagery of the 'high
tem?

factor in the city planning.
The provision of public drainage systems at
Harappan sites is well known. Street drains, either

At Harappa there were several separate covered or open, below street surface, conveyed walled areas. At Mohenjodaro also were several

waste from several houses to soakage dumps or suburbs but it is not known if all of them were cesspools at convenient points at Mohenjo-daro. walled. Taking our cue from medieval walled cities Side drains could feed major drains at right angles. in the region, it is likely that the suburbs developed

The drains were often of substantial dimensions, gradually as the area within the city walls became say 60 cm deep and 25 cm wide, and carefully contoo small to accommodate all who wished to live in structed of baked brick. Interconnected drains of the big city. While the citadel or high mound was the this sort must have a sufficient downward slope to seat of power in an Indus city, the lower town acted discharge effectively. When drains are public and

same purpose, the house ventilations were opened on the side of the main streets. Whether this was a factor in street planning or not, the orientation of



Lower town at Mohenjo-daro

Regular wheeled traffic cannot ply on narrow and tortuous streets, At Harappa,built citadels' 'frowning upon their cities with a hint(23) of alien domination' (1) applies (17).Wheeler
found the ruts of a cart to be just over 1 m apart. At
Similarly, it has been argued that citadel sites
Kalibangan, streets of 1.8 m width could not have
could represent the emergence of small and inde
taken two-way cart traffic but so are the steets of
pendent seats of power, at safe distance from the
may modern cities of Pakistan but still managing the
core zone, when the Harappan state(s) or ruling
cart traffic. Perhaps carts plied only the wide streets
house(s) branched out and fissioned or disinte
and could not be driven up to every house door.
grated into smaller units, and some ambitious indi

The excess to houses were general;lie from the
viduals cast off their ties with the center and built
side-streets, anyway. There is also the opinion that
their own centers in emulation of the central seats
the street patterning was designed to catch the
of domination. But independent successor states
fresh breeze by those who were familiar with the
are hard to imagine in an environment like the Mak
local climate and environment and, probably for the

ran and Gujarat.
The Lower Towns: The larger portion of the270
Indus cities was the so called Lower Town, so called
because it was built, generally but not always, at a
lower height than that of the citadel. This sector is

believed to be the habitation areas for the general
collect waste from several houses and are fed by
as a commercial and residential hub. Surprisingly,
branches, they would obviously have to be straight,
the lower towns were generally built on grid plan
and the system must be laid on a master plan. A
while the high mound did not always show such
public drainage system could not be laid on narrow
plan.and sinuous lanes which repeatedly rise and fall.
Lower Towns often contain some open ar
Neither can it be constructed piecemeal according
eas within the settlement. These could have been
to the decisions of individual householders, as was
places for people to meet or may have had some
recently learned from the attempts to improve the
part in exchange and trade. Other public rather than *Kacci*living conditions of the slum dwellers of the, a
place*Abadi*private structures included *caravansarais*
of Orangi at Karachi. Thus the grid pattern
where visiting merchants would have been accom
and street drainage systems are functionally interre
modated. These open spaces are generally outside
lated. But the latter is not the 'cause', as a grid pat
the city walls and this is in consonance with the
tern layout can be found even where street drains

general practice in historical times when strangers were always accommodated outside the town and were not allowed into the settlement at night.

Platforms: Massive platform emerged during the Harappan period as one of the fundamental architectural principles on which the cities were
the cities were built. The use of a platform was, however, not a

retaining walls, which gave some protection against flooding. These required enormous amounts of materials, time,

Ancient Pakistan - An Archaeological Historyand labor (calculated at around 4 million

unique feature of the Mature man-days for Mohenjo-daro) and were are absent. At Kalibangan, for example, there were**Town Planning!**disruption in the lives of the pre-existing inhabitants. Indus Civilization; its use was therefore possible only where sufficientsoakage pits and jars for individual houses, but noTown Planning**!**The grid pattern does not take shape gradually and

common even in the Early Indus
street or public drains in the residential area. Public
The Platforms
street drains were also absent at Banawali (19). InMassive platformof emerged**Town Planning**
Town Planning
Town Planning**!** manpower could be deployed and the a grid-plan town is not conceivable except as an necessary organizationexisted. Flood‘organic whole' (24), coming into being only when a Several
The Platforms
platform
emerged
both case, however, street planning is in evidence.such
damage has been reported at several
regulating authority decides on the layout of streets
Harappan sites, including Chanhu-daro
there has not been any attempt so far to examine
the origin and spread of this pattern of city planning*to Civilization***platform****the cities were built. The use of a**

The Antecedents of Steet Planning:

Massive during the Harappan period as Town Planning

Massive **of** the platforms, although of smaller WhileHarappan Civilization - The Material Cultureand the allocation of house plots. Thus for the old

one
and Lothal, confirming that flooding was **during the Harappan period as fundamental**
the planned pattern of streets at the known Harap
pan settlements have been lauded and marveled,sizes, one have**of** **architectural principles on which**
documented (Volume I: architectural principles on which *Prelude*
The Platforms
was, however, not a
platform**unique feature of the Mature**
inhabitants the new plan would have meant a termi
A boulders platform for houses in southern Baluchisa hazard endured by settlements located planning is in evidence.nation of existing house plot demarcations or own
brick, earth, and rubble with substantialin the floodplains and in some other ar
tion againsttan in the Early Indus period. Similar structures were
tiontion againstflooding.used by the Harappans to build their cities and towns.:

While the planned pattern of streets at the
Town Planning and labor (calculated at around 4 million new plots (at Kalibangan) or house plots would emerged known

Harappan
only the material of construction changedeas such as the Nal Depression. Jansen and labor (calculated at around 4 million

and labor (calculated at around 4 million
in
the
Bronze Age
platform era Massive
unique feature of the Mature Mohenjo-daro, have to be re-aligned (at Chanhu-daro). Stanis man-days for Mohenjo-daro) and were man-days for Mohenjo-daro) and were Harappa, and other Indus cities belonged. It is true
The
lauded and marveled, there has not been any purpose of one building



Indus Civilization; its use was during the Harappan period as lawski (24) points out that rectangular blocks of **man-days for Mohenjo-daro) and weretherefore possible only where sufficient**and

common even in the Early Indus fundamental
that some writers have casually considered common even in the Early Indus architectural principles on which residential quarters on a raised

therefore possible only where sufficient brick, earth, and rubble with substantial **manpower could be deployed and the** therefore possible only where sufficient spread of this pattern of city planning in the Bronze
necessary
retaining walls, which gave some protec
this pattern, concluding that it spontaneously **period in Baluchistan and Sind.** the cities were built. The use of a

The UM excavations conducted by G. F. Dales in 1964-65platform
manpower could be deployed and theagainst**organization** manpower could be deployed and the necessary
flooding. **existed.** Mohenjo-daro,**Flood** necessary tion**organization** required recommended
Several
period in Baluchistan and Sind.
such
was, however, not a
Harappa, and other Indus cities belonged. It is
examples platform
whoever or wherever they might be. This
for
exposed a massive mud brick platform that was used to of
raise a group of brick buildings several meters above thethe **platforms, although of smaller**
damage has been reported at several damage has been reported at severaland labor (calculated at around 4 million
enormous amounts of materials, time,**damage has been reported at several** theunique feature of the Mature



true that some writers have casually
consid**Harappan sites, including Chanhu-daro**
platforms, although of smaller Indus Civilization; its use was Harappan sites, including Chanhu-daro **street level which was seen in the foreground. The street** habitational area from flood. It **sizes,** **have** **have been**
the light of the history of the known Old**sizes,** **been**
was approximately seven meters wide extending north**documented (Volume I:**
World civilizations. Only in the Indus Valley
to Civilization
).
Prelude
examples
south along the edge of HR Area at plain level. Looking
and Lothal, confirming that flooding was therefore possible only where sufficient
found and common even in the Early Indus **A boulders platform for houses in southern Baluchis**[a]
hazard endured by settlements located found **and A boulders platform for houses in southern Baluchis**Floodperiod in
Baluchistan and Sind. **tan in the Early Indus period. Similar structures were** **in the floodplains and in some other ar****tan in the Early Indus period. Similar structures were used by the Harappans to build their cities and towns.:** of such eas such as the Nal Depression. Jansen ***to Civilization*** platforms, although of smaller **used by the Harappans to build their cities and towns.:** light of the history of the known Old World civi**south, it is clear that some buildings were located to the**since some of these sites were only the material of construction changedonly the material of

construction changed
of
have
been
found
only the material of construction changedand Lothal, confirming that flooding was and
lizations. Only in the Indus Valley is this pattern
regions which were directly associated with,not situated at the banks of rivers **building** **building**



A boulders platform for houses in southern Baluchisa hazard endured by settlements locateddocumented (Volume I: *Prelude* tan in the Early Indus period. Similar structures were or accessible to, the Indus Valley showed its **residential quarters on a raised** residential quarters on a raised



used by the Harappans to build their cities and towns.: **The UM excavations conducted by G. F. Dales in 1964-65is generally**believed).



eas such as the Nal Depression. Jansen

The UM excavations conducted by G. F. Dales in 1964-65 believed exposed a massive mud brick platform that was used to the purpose the**the**residential quarters on a raised tion; its use was common even in the Early Indus **street level which was seen in the foreground. The street** platform**habitational area from flood. It**is generally**The UM excavations conducted by G. F. Dales in 1964-65**believed **exposed a massive mud brick platform that was used to**

period in Baluchistan and Sindh. Several exam**was approximately seven meters wide extending north has, however, been argued that** protection of the**raise a group of brick buildings several meters above the**

cation of incipient town planning of this na**south along the edge of HR Area at plain level. Looking** **street level which was seen in the foreground. The street** habitational area from flood. It

ples of such platforms, although of smaller sizes, **south, it is clear that some buildings were located to thesouth, it is clear that some buildings were located to the**has, however, been argued that have been found and documented (12). A number **! not situated at the banks of rivers was approximately seven meters wide extending north**

west of the street, but most structures have been erodednot situated at the banks of rivers south along the edge of HR Area at plain level. Looking or flood prone water courses, the since some of these sites were

sites of fourth millennium BC in Sindh and

and still is a reality in Sind and **south, it is clear that some buildings were located to the**

function of these platforms could not situated at the banks of rivers

Baluchistan. Thus, it is possible that such an Baluchistan. systems are functionally interrelated. But the latter is unique feature of the Mature Harappan Civiliza**function of these platforms could** or flood prone water courses, the function of these platforms could not have been the protection



tion; its use was common even in the Early Indus
idealized proposition of town planning could **not have been the protection**
tion; its use was common even in the Early Indus
be based on the Early Harappan precedent period in Baluchistan and Sindh. Several exam
ples of such platforms, although of smaller sizes, ples of such platforms, although of smaller sizes,but flash flooding after rain was
Rehman Dheri in western Punjab.
Town Planning
have been found and documented (12). A number
Town Planning
but flash flooding after rain was
have been found and documented (12). A number
dential area. Public street drains were also absent at **and still is a reality in Sind and** and still is a reality in Sind and **Baluchistan.**
Baluchistan. whole The remnants of a house platform at Harappa. Note Mohenjo-daro, more than 6 meters settlements served as protection against floods. At other times they served as solid, level **The remnants of a house platform at Harappa. Note**
The remnants of a house platform at Harappa. Note Platforms served a number of The remnants of a house platform at Harappa. Note houses are inconvenient for house owners in
Platforms served a number of
only the material of construction changed has demonstrated that the platforms at existence in subsequent times. **is generally** believed of building
unique feature of the Mature Harappan Civiliza **for** for **the** **raise a group of brick buildings several meters above the** the
Town Planning
west of the street, but most structures have been eroded
unique feature of the Mature Harappan Civiliza





function of these platforms could

The remnants of a house platform at Harappa. Note **period in Baluchistan and Sindh. Several exam**tion; its use was common even in the Early Indus **The remnants of a house platform at Harappa. Note the use of**

Harappa. Note the use of bricks instead of

from flood. This is generally true the use of bricks instead of boulders in the Baluch ex

as is surmised from the aerial photograph of

Town Planning Town Planning

ample depicted blew.boulders in the Baluch example of the ample of the Early Indus period

The Platforms

emerged

Massive emergedplatform

buildings Baluchistan. Baluchistan. the

The remnants of a house platform at

purposes. **Platforms served a number of** the emergedpurposes. purposes.
foundations for buildings. These platforms, one side of which might be several tens of **First, the** elevated emerged
emerged **purposes.** First, the whole during the Harappan period as **buildings** buildings **elevated** the meters long, also served the purpose of protecting one edge of a settled area from or or
fundamental
of
the
fundamental
buildings
settlements served as protection against floods. At other times they served as solid, levelor
the whole one **the** **whole**
the use of bricks instead of boulders in the Baluch ex**Harappa. Note the use of bricks instead of boulders in the Baluch example of the**
the use of bricks instead of boulders in the Baluch exterms of light and air. But a chessboard plan
ample of the Early Indus period **boulders in the Baluch example of the**
ample of the Early Indus period allows for the rapid building of a town, being settlements served as protection against floods. At other times they served as solid, level
high, raised the city above any possihigh, raised the city above any possi
regions purpose, and fundamental
general erosion and of forming a manmade boundary, segregating a particular settled
settlements served as protection against floods. At other times they served as solid, level
settlements served as protection against floods. At other times they served as solid, level
foundations for buildings. These platforms, one side of which might be several tens of **Mohenjo-daro, more than 6 meters**
fundamental
architectural principles on which
foundations for buildings. These platforms, one side of which might be several tens of
high, raised the city above any possi**meters long, also served the purpose of protecting one edge of a settled area from** high, raised the city above any possiments, and for easy extensions of the town in fundamental
the cities were built. The use of a
area from those around it. Finally, some of the platforms were substructures that had
ture Indus period can be better eluci
ble floodwaters importance,its existence in subsequent times.and subsequent periods (25). We therefore infer general erosion and of forming a manmade boundary, segregating a particular settled ble floodwaters ture Indus period can be better eluciarea from those around it. Finally, some of the platforms were substructures that hadfoundations for buildings. These platforms, one side of which might be several tens of of platform was, however, not a considerably elevated section of the settlement to differentiate it from the rest.general erosion and of forming a manmade boundary, segregating a particular settled meters long, also served the purpose of protecting one edge of a settled area from examination area from those around it. Finally, some of the platforms were substructures that hadconsiderably elevated section of the settlement to differentiate it from the rest. **The**datedimportance, examinationpurpose, **and**that the grid plan settlement involved comMohenjo-daro. The city was designed pulsory settlement of people according to
unique feature of the Mature

general erosion and of forming a manmade boundary, segregating a particular settled Mohenjo-daro. The city was designed general erosion and of forming a manmade boundary, segregating a particular settled

datedsignificance of the platforms in Maconsiderably elevated section of the settlement to differentiate it from the rest.Age is that of Mohenjo-daro although

Indus Civilization; its use was
The importance, purpose, and significance of the platforms in Mature Indus period can **ture Indus period can be better eluciarea from those around it. Finally, some of the platforms were substructures that had** The importance, purpose, and significance of the platforms in Mature Indus period can be better elucidated through the examination of Mohenjodaro. The city was designed in of
common even in the Early Indus **considerably elevated section of the settlement to differentiate it from the rest.**
period in Baluchistan and Sind. The importance, purpose, and significance of the platforms in Mature Indus period can be better elucidated through the examination of Mohenjodaro. The city was designed in Page 263
ning of this nature are at hand at someof Mohenjo-daro. The city was designed
Mohenjo-daro. The city was designed in part as a settlement on the floodlent river. Serious flooding of the Inbe better elucidated through the examination of Mohenjodaro. The city was designed in **The importance, purpose, and significance of the platforms in Mature Indus period can** in part as a settlement on the floodSeveral
examples
of
such
The solution to thisproblem be better elucidated through the examination of Mohenjodaro. The city was designed in plain of a tremendously powerful, vioplain of a tremendously powerful, vioat Corroborative data from various his
platforms, although of smaller be better elucidated through the examination of Mohenjodaro. The city was designed in interpretation. of such been found and
of
such
documented (Volume I: *Prelude*



Page 263 The solutionto raise therecorded every five to seven years.and streets

A boulders platform for houses in southern Baluchis
sizes, Gleave (26) shows that in the early twentiethA boulders platform for houses in southern Baluchisdus River in historical times has beenproblem at**tan in the Early Indus period. Similar structures were used by the Harappans**century many Yoruba people were encourof

tan in the Early Indus period. Similar structures were
to build their cities and towns.: only the material of construction changed
The solution

Mohenjo-daro was to build platforms dent as is surmised from the aerial photo

raise
recorded every five to seven years. Mohenjo-daro was to build platforms at

been of found **such** and *to Civilization* found
and
Prelude
).
A boulders platform for houses in southern Baluchis
used by the Harappans to build their cities and towns.:
tograph of Rehman Dheri in western

to
above the flood levels just as the
to
to

this
tlement above the flash floods.problem at aged to resettle in new locales by the British
only the material of construction changed
tan in the Early Indus period. Similar structures were used by the Harappans
A boulders platform for houses in southern Baluchis of settlements, including Mohenjo-daro, Harappa,
Punjab. raise Mohenjo-daro was to build platforms and streets
to
early platforms were foundation strucMohenjo-daro was to build platforms to
raise
above the flood levels just as the
The
purpose
tan in the Early Indus period. Similar structures were used by the Harappans
tan in the Early Indus period. Similar structures were

A boulders platform for houses in southern Baluchis

Civilization is the Mound of the Great Bath at Mo**streets** vehicular traffic, services, and administrative **found**
Prelude
residential quarters on a raised
tan in the Early Indus period. Similar structures were used by the Harappans henjodaro, which is
manmade and built on Indus**above the flood levels just as the**
A boulders platform for houses in southern Baluchis**tan in the Early Indus period. Similar structures were used by the Harappans**
and
platform *Prelude* is generally
of *Prelude* the protection
tan in the Early Indus period. Similar structures were used by the Harappans alluvium. To contain the earthen fill and inhibit eroearly platforms were foundation struc

believed tan in the Early Indus period. Similar structures were early platforms were foundation struc(not to speak of political control).

A typical raised platform of the Indus tures that substantially raised the set The new towns had the same house types,

used by the Harappans to build their cities and towns.:

Civilization is the Mound of the Great Bath at Mo
tures that substantially raised the set
for
building
of
the
Chanhu-daro, Lothal, and Banawali, were wholly or
tlement above the flash floods. tlement above the flash floods. henjodaro, which is manmade and built on IndusCivilization is the Mound of the Great Bath at Mocrafts, markets and economy as did the old
of
building
used by the Harappans to build their cities and towns.:
292 tled for generations, its implementation
habitational area from flood. It
alluvium. To contain the earthen fill and inhibit eroA typical raised platform of the Indus

only the material of construction changedhenjodaro, which is manmade and built on Indus but they differed from the old in that they wereof settlements, including Mohenjo-daro, Harappa,A typical raised platform of the Indus

of
buildinghas, however, been argued that **of settlements, including Mohenjo-daro, Harappa,** Not all Harappan cities were founded on Civilization is the Mound of the Great Bath at MoCivilization is the Mound of the Great Bath at Mobuilding
Chanhu-daro, Lothal, and Banawali, were wholly or Civilization is the Mound of the Great Bath at Mo
Chanhu-daro, Lothal, and Banawali, were wholly or Chanhu-daro, Lothal, and Banawali, were wholly or virgin soil: most of them, in fact, arose on the ruins henjodaro, which is manmade and built on Indus One of the more believed the **partly founded on artificial platforms made of mud** henjodaro, which is manmade and built on Indus
of
the not situated at the banks of rivers partly founded on artificial platforms made of mud of the old settlement. The question arises that if the innovative aspects of Indus city planning not known
believed alluvium. To contain the earthen fill and inhibit ero
believed or flood prone water courses, the grid plan was introduced at a place already settled of of
the function of these platforms could for generations, its implementation would mean a the

not have been the protection
from flood. This is generally true

but flash flooding after rain was

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292 292 and still is a reality in Sind and



Baluchistan.



from previous periods was its system of public works (6,7). Harappan engineers specialized in

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sion, the builders of the Mound of the Great Bath bullock carts to move freely

over the city. It

Harappan Civilization - The material culture

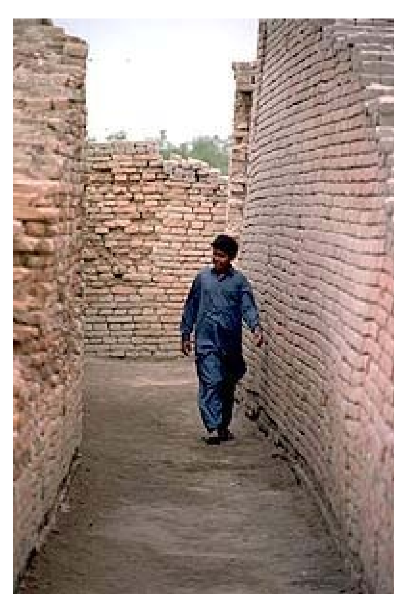
put a retaining wall around their "hill." This helped topriesthood of which religious professions could be an important part.. Some scholars keep everything in place. It also defined the Moundargue that street planning of Harappan cities is the outcome of the necessity for wheeled of the Great Bath architecturally. One important

sion, the builders of the Mound of the Great Bathreasons for raising platforms could be the perennial many innovations that provided fresh water to their
city dwellers and took care of theproblem of rising water table and the corrosionofkeep everything in place. It also defined the Mounddisposal
caused by salt deposits on the foundation of build
wastewater. Probably not until Roman times did
of the Great Bath architecturally. One important
people devise so many clever construction tech
reasons for raising platforms could be the perennialPlatforms were not raised for building con
problem of rising water table and the corrosionstruction on them alone. In some parts of Mohenjo
posal systems had been designed at settlements in
caused by salt deposits on the foundation of builddaro and Kalibangan, brick platforms stood outside
Syria and Iran about a thousand years earlier, it
ing.
the houses. These may have been places for peo
seems unlikely that the Hardpans knew about them
ple to sit and talk, like the village chowk in the rural
Platforms were not raised for building con
areas of present-day Pakistan.(8). Even if they did, the Hardpans did it much bet
struction on them alone. In some parts of Mohenjo
ter.**Streets Layout:** A remarkable feature ofdaro and Kalibangan, brick platforms stood outsideWater played a vital part in the life of the
the houses. These may have been places for peothe large urban settlements of the Harappan Civili
Harappan people, and they were skilled hydraulic
ple to sit and talk, like the village chowk in the ruralzation is the regularity of street layouts. The north
engineers. Nowhere is the sophisticated town plan
areas of present-day Pakistan.
south alignment of long thoroughfares at such an
ning in Harappan cities more impressive than in the
Streets Layout:
early period is unparalleled in history.A remarkable feature ofSuch a con
structural features relating to the supply of water
the large urban settlements of the Harappan Civilicept of planned 'boulevards' and streets is also con
and the disposal of the affluent. It seems as though

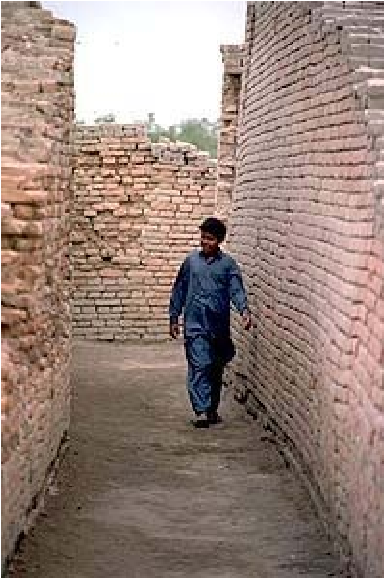
firmed by a straight alignment of house walls along

zation is the regularity of street layouts. The north
south alignment of long thoroughfares at such an the streets. This type of street planning and the high
early period is unparalleled in history. Such a con
cept of planned 'boulevards' and streets is also con
firmed by a straight alignment of house walls along
the streets. This type of street planning and the high

bullock carts to move freely over the city. It



best-built structures do not stand on the
is however unlikely as the grid of wide and
main streets
narrow streets does not give a symbolic
significance of the town plan may
form to the Harappan city: the largest and
elsewhere.
best-built structures do not stand on the main streets
In Mohenjodaro and Harappa, the sewage
significance of the town plan may
drains ran along the streets which were
elsewhere.



mostly straight. There is evidence at some
other sites In Mohenjodaro and Harappa, the sewage
Planned streets made street drains possible.
drains ran along the streets which were
Thus, it is thought that
mostly straight. There is evidence at some other
became a prerequisite for an effective sites drainage system and the need for drainage Planned streets made street drains possible. necessitated a grid street plan. However, Thus, it is thought that we cannot say that streets on a rectangular became a prerequisite for an effective grid are functionally always related to a drainage system and the need for drainage street drainage system, for Kalibangan was



necessitated a grid street plan. However,

laid on a grid but lacks street drains
we cannot say that streets on a rectangular
there were, instead, jars embedded along
grid are functionally always related to a
A narrow street at Mohenjodaro the edges of streets to catch the sewage

A street in the Lower Town at Dholavira

street drainage system, for Kalibangan was
from houses.
laid on a grid but lacks street drains
It has been stated above more than once that the plans of the Harappan
settlements there were, instead, jars embedded along sense of sanitation and
strict observance of the the edges of streets to catch the sewage rules of regularity
suggest a community of people
degrees from these in their orientation. Asko Parpola and a number of other
scholars who were certainly disciplinary and punctilious infrom houses.
relate this to the astronomical knowledge of the Indus people. They demonstrate
that the

their behavior patterns at least during the mature

It has been stated above more than once that the plans of the Harappan
settlements
water asphase of the Harappan Civilization.cardinal orientation of the streets
could have been achieved by aligning them with the

sense of sanitation and strict observance of the

closely follow the cardinal directions, the streets diverging by no more than a few

rules of regularity suggest a community of people

setting point of particular stars and constellations. Some religious considerations
are

generally divided Harappan towns and cities into

who were certainly disciplinary and punctilious inrectangular residential blocks.
The impression of degrees from these in their orientation. Asko Parpola and a
number of other scholars

relate this to the astronomical knowledge of the Indus people. They demonstrate that the

their behavior patterns at least during the mature

cardinal orientation of the streets could have been achieved by aligning them with the

phase of the Harappan Civilization.

to the importance of water in the life of the Indus Straight, cardinally orientated, main streetssettlements were laid out in a checkerboardlike grid however, inadequate. In Mesopotamia, Egypt, and early Greece the orientation of a people". Water was important in the Indus Civiliza setting point of particular stars and constellations. Some religious considerations are generally divided Harappan towns and cities into building and even a street was common, but it did not lead to the laying out of other over again in the archaeological literature. Recentbelieved to lie behind this particular direction of the streets.

rectangular residential blocks. The impression of sustained the life of humans, plants, and animals. the early excavators at Mohenjo-daro, reinforced by research has, however, questioned the significance,

The religious underpinning of the cardinal direction of streets in the Harappan cities is,

excavations at Harappa and Kalibangan, was that

settlements were laid out in a checkerboardlike gridhowever, inadequate. In Mesopotamia, Egypt, and early Greece the orientation of a

brick-lined wells. Dirty, polluted water was moved pattern and this claim has been repeated over and

building and even a street was common, but it did not lead to the laying out of other evident Page 272

over again in the archaeological literature. Recent at

streets in accordance. On the other hand, in the Indus Valley there was obvious

research has, however, questioned the significance,

orientation of all the streets and rectangularity of blocks, yet excavation has

shown no

or even the existence, of such a ‘gridiron layout’.
water for the inhabitants of some cities, it could not into a 'gridiron lay-out'. Indeed, a review of pub
have been convenient for the other locations. De
lished excavation plans reveals that the vast major
famous 'grid pattern'. According to them, only the north-south
ity of the gridiron layout at Harappan sites is repreaxis ofvoirs and cisterns were built within the
cities to enStreet is evident at Mohenjo-daro. The second axis to the east is notsented by dotted lines
through un-excavated areas rather than the solid lines of actually excavated
proved, all other streets turn corners and do not fit
streets. A Monhenjo-daro street with drain along the into a 'gridiron lay-out'. Indeed, a review of pub
meters deep built of wedge-shaped, standard-size
A narrow street at Mohenjo-daro
side of the thoroughfare of a gridiron street plan has lished excavation plans reveals that the vast majorprobably influenced the placing of these "dotted
bricks. At other locations, such as those in Kutch
ity of the gridiron layout at Harappan sites is repre line" streets through unexcavated areas. According
and Saurashtra, water supply was ensured through sented by dotted lines through un-excavated areas
[272]rather than the solid lines of actually excavated streets. A Monhenjo-daro street with drain along the
293
A narrow street at Mohenjo-daro
side of the thoroughfare of a gridiron street plan has
probably influenced the placing of these "dotted
Ancient Pakistan - An Archaeological History

an extensive inventory of water reservoirs which Town Planning the best suited to withstand the lateral pressure bearing on the sides of the long vertical structure of bricks.
collected rain water through an elaborate system of channels and diverters. Given the state of technology in other Bronze Age cultures, it is all the more to these opinions, the existence of a cultural norm

astonishing that the Harappan urban phase seems
prescribing the orientation of all buildings according
to have been accompanied by fully developed, built
to the cardinal directions would of itself produce a
in water supply and affluent disposal systems, and
superficial "gridiron pattern," without the existence
that the evidence of these installations has turned
of centralized authority or a developed sense of
up in every Harappan settlement investigated to
date. town planning. One cannot help questioning as to *Wells:*
what extent the presumed right-angle street pattern
Wells have been discovered in large
Harappan cities, such asis valid on archaeological grounds.Mohenjo-daro and

Such a criticism may be valid if not carried
Harappa, as well as in small towns, such as Altoo far to become absurd. It would certainly be
lahdino. These were constructed with specially de
worthwhile to re-examine the available data to see if
signed wedge-shaped bricks, which were placed
alternative explanations may be proposed. Till then,
with their smaller end facing toward the center of

Michael Jansen (6,7) has calculated that theredifferent,weresomesevenplanned,hundred
somemorerudimentarily at

Mohenjo-daro,
planned, and some not planned at all.or wells present in one in three houses.
Whether the indus cities, even Mohenjo-daro
Those without a well of their own, however, were by itself, were laid out on a gridiron plan or not, can
served by the public water supply, and the great
be argued either way and we shall not indulge here
wear around the rims of wells in houses suggests
in such a hair-splitting discussion at this time. In
that they too were used by more than the immediate
stead, we shall be content to note that the street
household. Occasionally, low brick platforms pro
layout was generally planned and it was governed
vided seats around the well. It is not difficult to
by precise criteria, leading to a generalized gridiron
imagine knots of people, some sitting, others stand
plan.
We must clarify at the outset, however, that
ing, passing the time, sharing gossip and news neither at Mohenjo-daro nor at any other Mature
while waiting their turn to draw water. Such a scene
Harappan settlement do we have a base grid of the
is still witnessed in some parts of Pakistan even



A view of the 'Divinity Street' at Mohrnjo-daro

the well. Built in this way, wells were able to with
one must be satisfied in assuming that the dotted
stand lateral pressure when they were sunk into the
lines are the result of thoughtful thinking of a great
ground. A large number of wells were apparently
number of prominent archaeologists and not fig
sunk in each city and town, mostly private but some
ment of imagination of any single individual. These
also in public domain. This is probably clearest at
'dotteds lines' represent a consensus of a large
Mohenjo-daro and Harappa where wells, elaborate number of excavators over a long period of time.
drainage systems, and residential bathing facilities
Still, we should be on guard and see clearly

in virtually all the houses distinguish the Indus Civithat only Mohenjo-daro, and to some extentlization
from all other civilizations of the Bronze Age.

At
Mohenjo-daro,
for
example,
Harappa and Kalibangan, is the only Indus city
numerous wells
where an extensive street planning is in evidence.
were dug throughout the city and maintained for
At other places, the tendency for grid layout of
hundreds of years. Some wells at Mohenjo-daro are
streets is in evidence but we cannot say that these
as small as 60 centimeters in diameter; one was as
cities were 'planned' in the sense Mohenjo-daro

large as 2.1 meters. The average is about 1 meter.
was. Some Indian archaeologists tend to read more
From the technical point of view, the cylindrical well
in the ruins of Lothal, Kalibangan, Banawali, and
shafts are an impressive feat of engineering as they
others than what there actually is. Similarly, the
bear out the fact that the circular form is statically
western scholars have a tendency to generalize the 273town planning of Mohenjo-daro and Harappa to all
the cities of the Indus Civilization. Each city was
today. Needless to say, a water supply network on
accuracy or symmetric squares of a Roman town.
this scale within the actual city itself was unheard of
Instead, there are systems of wide streets running
in this period. Contemporary Egyptians and Meso
down the lengths of habitation areas, not perfectly
potamians, for instance, had to make do with fetch
parallel with one another, and intersected by nar
ing water bucket-by-bucket from the river and then
rower streets, usually at right angles but in a stag
storing it in tanks at home in the city until needed.
gered manner (so that there are few square junc
Grooves in the well curb show that water was drawn
tions), and with the side streets often dog-legged.
using containers, such as pots or wood buckets,
What we do have, then, is the division of habitation
attached to ropes.The huge number of wells at
areas into roughly rectangular blocks, each of which
Mohenjo-daro indicates that the city was too far
contains several houses.from the river for convenience; Jansen (4) suggests
AtMohenjo-daroanarterialnorth-south
that pits dug to extract clay for construction filled street, about 9 m wide and named 'First Street', was
with rainwater and may have been used as an addi
exposed in the DK-G area excavations. The same
tional water source for the city.
street alignment can be picked up further south in
Archaeological observations trace the con
the VS area, and then even further south in the HR
tinuity of well location over the stratigraphic build up
area. North of HR, a wide depression today cuts the
of Mohenjo-daro and probably other sites. Courses

lower city between the 50 m contours. This depression crosses First Street at a right angle and is very likely to have been a major thoroughfare. In fact it has been called 'East Street' and on the north it is

allel to one another and following the alignment ofTown PlanningTown Planning!the city walls. Single rows of houses form blocks Town Planning
Town Planning!between each two streets. This is not a grid of recTown Planning !Harappan Civilization -

circular form
circular form
istangular blocks, and streets are not always straight;statically the best suited to While the gridiron pattern of street planning at the known Harappan settlements have
isright angles, from the south. There was apparently
withstand the lateral pressure bearing on the sides statically the best suited to been lauded and marveled, there has not been any attempt so far to examine the origin

grew. When the early excavators had cleared some
published plan nevertheless indicates a kind of grid,

withstand the lateral pressure bearing on the sides
of the long vertical structure of bricks. and spread of this pattern of city planning in the Bronze Age era to which Mohenjodaro,
withstand the lateral pressure bearing on the sides

maintained over a period of accumulation of more

of the long vertical structure of bricks. residential area of Lothal was divided into rectangu
the site today is quite brackish. Remarkable as itHarappa, and other Indus cities belonged. It is true that some writers have casuallyAt Mohenjo-daro, mostlar blocks by side streets and lanes, which in turn of considered this pattern, concluding that it spontaneously recommended itself to the town of builders whoever or wherever they might be. This assumption, however, does not hold up in

ThehouseplansofMoundII,second may seem, the well locations at Mohenjo-daro seem

At Mohenjo-daro, most houses or blockshouses had at least one private well and many
houses had at least one private well and many
neighborhoods had public wells along the main
neighborhoods had public wells along the main
streets for travelers and the general public. On the basis of thestreets for travelers and the general public. On thethe the light of the history of the known Oldnumber of wells found in



basis of thebasis of themore crooked course. The main streets were oftennumber of wells found in the the World civilizations. Only in the Indus Valley excavated areas, Jansen estimated that there were A small diameter well at Harappaexcavated areas, Jansen estimated that there were is this pattern in existence and only those

A small diameter well at Harappa **A small diameter well at Harappa**

**regions which were directly associated with,
or accessible to, the Indus Valley showed its
about 700 at Mohenjodaro. Needless to say, a**
about 700 at Mohenjodaro. Needless to say, a
water supply network on this scale within the
water supply network on this scale within the
**actual city itself was unheard of at this period.
Contemporary Egyptians and Mesopotamians, for actual city itself was unheard of at this period. existence in subsequent times. Contemporary Egyptians and Mesopotamians, for
instance, had to make do with fetching water The earliest instance, had to make do with fetching water
bucket-by-bucket from the river and then storing it pattern of
in tanks at home in the city until needed.**

course, for reasons given below, we would not ex

**in tanks at home in the city until needed. pect all Harappan settlements to have been built on Mohenjodaro
record we have of a gridiron street planning is that of although some indication of Archaeological observations trace the continuity incipient town planning of this nature are at Archaeological observations trace the continuity**

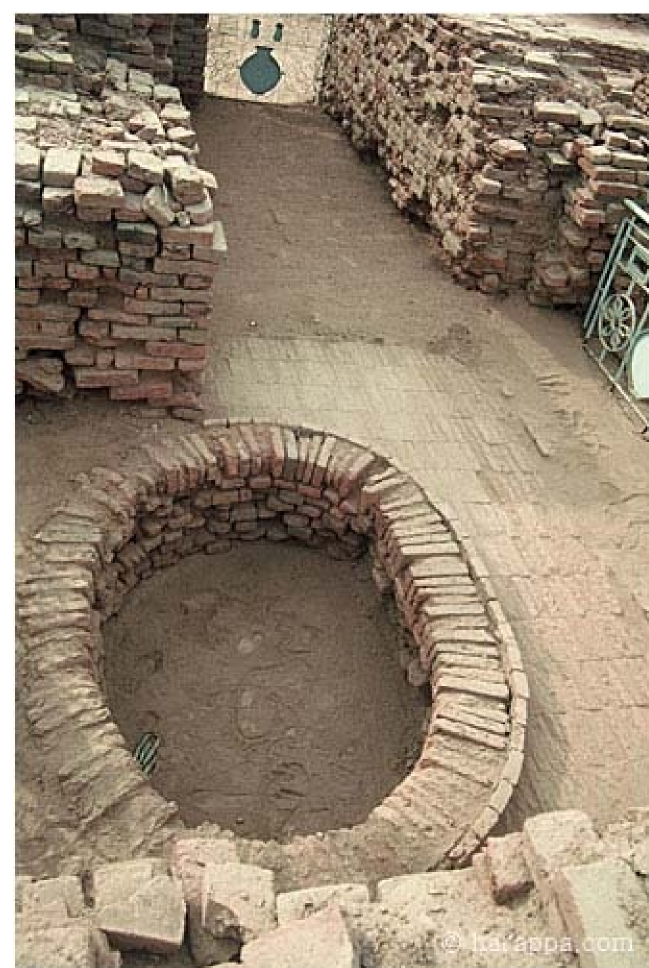
of well location over the stratigraphic build up of hand at some Early Indus sites of fourth of well location over the stratigraphic build up of Mohenjo-daro and probably other sites. Courses millennium BC. We look around in the west,

the

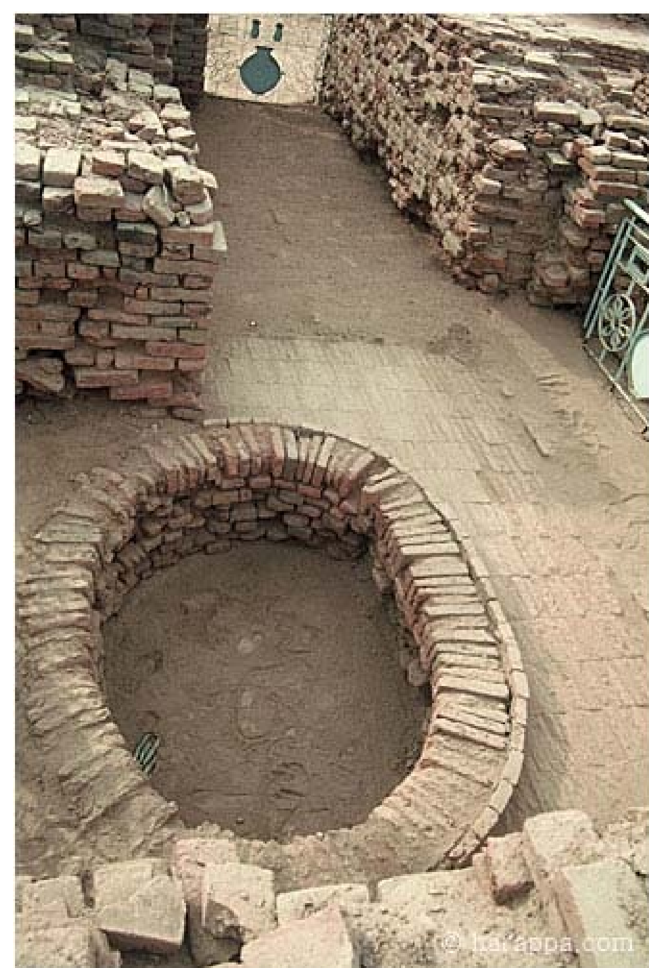
Mohenjo-daro and probably other sites. Courses of bricks were added to wells as the city mound that is, in the Near East or in the northwest, of bricks were added to wells as the city mound grew. When the early excavators had cleared some grew. When the early excavators had cleared some that is, in Central Asia, or even in the of these wells, they once again began to fill with northeast, that is, in China, but we do not find of these wells, they once again began to fill with water, although much of the ground water around anywhere any city that entailed such a street water, although much of the ground water around may seem,

streets at Mohenjo-daro. Occasionally an excavator

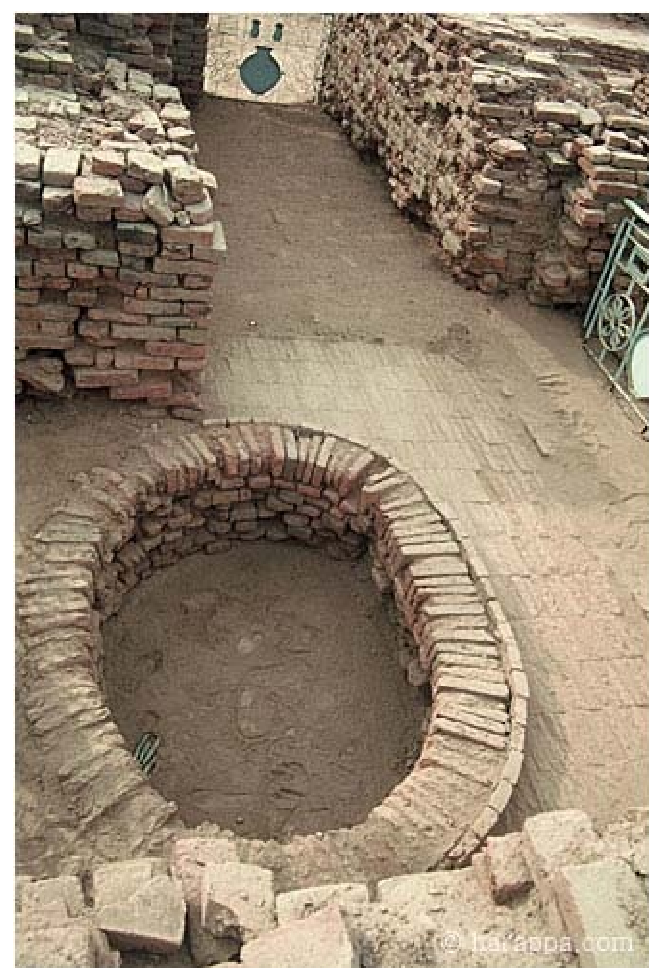
the well locations at Mohenjodaro the site today is quite brackish. Remarkable as it planning. All of the cities in all of the known may seem,mentions a chess-board layout but presents no sitethe well locations at Mohenjodaro seem to have been laid out when the originalcivilizations of the Bronze Age arosemay seem,plan as corroborative evidence. In some large setthe well locations at Mohenjodaro platforms were built and were maintained over the haphazardly without any discernible town were seem to have been laid out when the original



history of the city with almost no changes. The planning. Also, nowhere did this plan appear history of the city with almost no changes. The platforms were built and were maintained over the



these facilities gives rise to the in the New World, statements to the contrary existence ofhistory of the city with almost no changes. The



An ovel-shaped well at Mohenjo

existence of
speculations that their locations were preplanned.
beams that may have formed a gate or some kind of traf notwithstanding. For the next known example speculations that their locations were preplanned.
the existence of a grid plan. At the same time there An ovel-shaped well at Mohenjo-daro (after Kenoyer) whilespeculations that their locations were preplanned. we must seek much later times, in the eighths
distance between wells is remarkably consistent in
The area served by each well and the mean anothercenturydistance between wells is remarkably consistent in

daro (after Kenoyer)

BC in the eastern Mediterranean, when Sargon of Assyria tried to establish an the Lower distance between wells is remarkably consistent in is found at Mohenjo-daro but Harappa, Kalibangan,another ill-fated and short-lived capital Dur-Sarginu. the reflection of the planninghenjodaro from the very beginning. Some were

streets and could infer the presence of wider and that went into Mo another

also provide good evidence for this practice. It may

maintaining the
that went into Moreflection of the planningabandoned, but we knSimplyhenjodaro from the very beginning. Some were
Thus, according to present evidence, the rectangular grid was nowhere a casual,

town-planning' in Harappa II levels'.
parallel streets, wide as well as narrow. The reason

abandoned, but we knSimply
system so that it was not clogged must have been henjodaro from the very beginning. Some were maintaining the spontaneous thing. In spite of its apparent obviousness, it would seem that it was not put abandoned, but we knSimplya significant task in itself. ow of no wells newly
system so that it was not clogged must have been


could be that the entire citadel was one integrated

system so that it was not clogged must have been sited and constructed after the initial platform was into practice by any civilization except that of the Indus Valley and later by those who
built. a significant task in itself. ow of no wells newly
a significant task in itself. ow of no wells newly A heart-shaped well at Mohenjo sited and constructed after the initial platform was



so that it was not clogged must have been a signifidaro. Who say that the Harappans sited and constructed after the initial platform was Wells are found not only at Mohenjodaro but also A heart-shaped well at Mohenj-daro daro. Who say



built. Theories as to the origin of the grid is based on its obvious efficiency in the use of space A heart-shaped well at Mohenjobuilt. at other Harappan sites. For example, brick-lined
where rectangular buildings are involved. The reasoning is seductive but not borne out
Wells are found not only at Mohenjodaro but also wells have been located at Harappa; their number were not romantic? (after Kenoyer)daro. Who say that the Harappans Wells are found not only at Mohenjodaro but also by facts. Examples of strict rectangularity of buildings with highly irregular street
at other Harappan sites. For example, brick-lined were not romantic? (after Kenoyer)
at other Harappan sites. For example, brick-lined pattern are far too common. They long predate the first use of the grid and continue to
wells have been located at Harappa; their number 295wells have been located at Harappa; their numberthe present in large areas of the world, including Pakistan.

Throughout the long early

One of the unique Harappan architectural features pertains to the obsession of the rise and fall. Neither can it be constructed pieceIndus people for water. Water and its management played an interesting role in their

and
found the ruts of a cart to be just over 1 m apart. At

Indus people for water. Water and its management played an interesting role in their meal to the decisions of individual life. This is probably clearest at Mohenjodaro and Harappa where wells, elaborate individual

found the ruts of a cart to be just over 1 m apart. AtKalibangan, streets of 1.8 m width could not have meal according to the decisions ofhouseholders, as was recently learned from the householders, as was recently learned from the

life. This is probably clearest at Mohenjodaro and Harappa where wells, elaborate drainage systems, and residential bathing facilities in virtually all the houses distinguish

Kalibangan, streets of 1.8 m width could not have attempts to improve the living conditions of the slum drainage systems, and residential bathing facilities in virtually all the houses distinguish

taken two-way cart traffic but so are the steets of the Indus Civilization from all other civilizations of the Bronze Age. The public display

may modern cities of Pakistan but still managing the dwellers of the *Kacci Abadi* of Orangi at Karachi.
may modern cities of Pakistan but still managing the brick-lined wells have been located at Harappa;
the Indus Civilization from all other civilizations of the Bronze Age. The public display
cart traffic. Perhaps carts plied only the wide streets their number was probably not more than 30.
Kali
or use of water, such as the Great Bath at Mohenjodaro and the Water Tank (sometimes
dwellers of the
those moths when the surrounding water table rose
Thus the grid pattern and street drainage systems
to some higher levels. Their location on elevated
Thus the grid pattern and street drainage systems are functionally interrelated. But the latter is not the
and could not be driven up to every house door. grounds indicate that the water was used for irriga

called a “dock’) at Dholavira is another manifestation of this obsession of water. Water **called a “dock’) at Dholavira is another manifestation of this obsession of water. Water**

The excess to houses were general;lie from the
and so does Lothal. Allahdino is known to have two
'cause', as a grid pattern layout can be found even 'cause', as a grid pattern layout can be found even

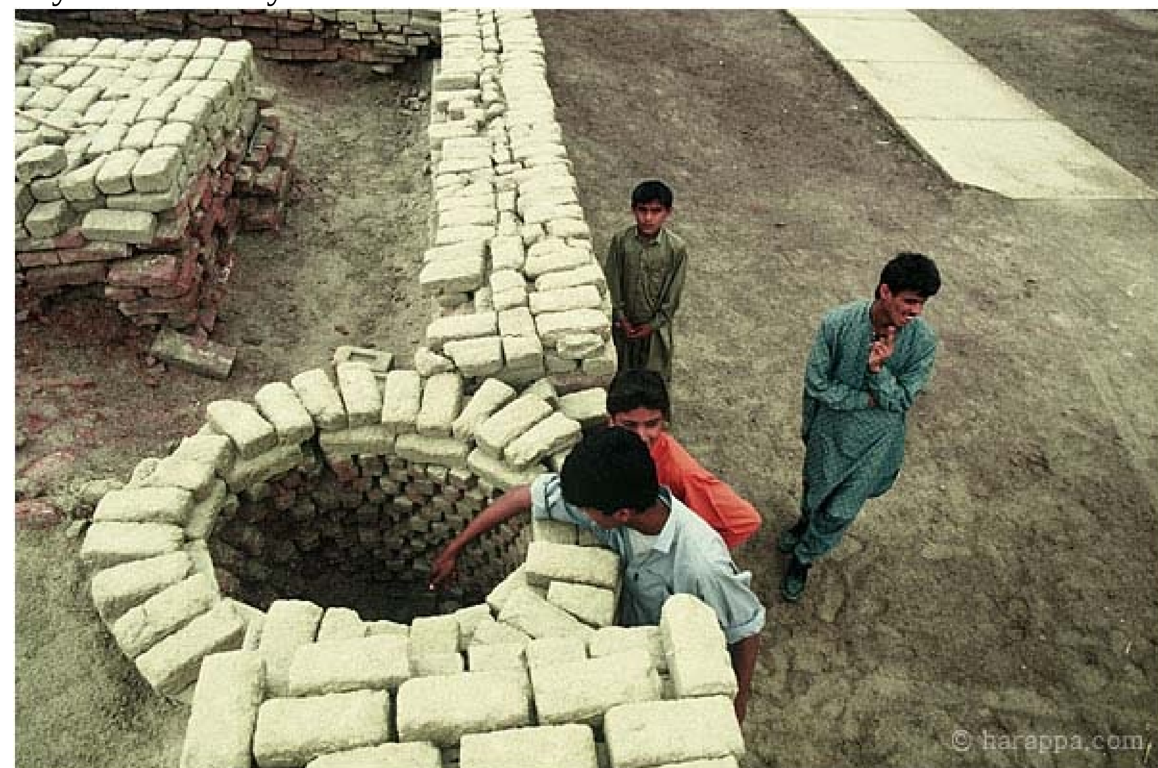
side-streets, anyway. There is also the opinion that
side-streets, anyway. There is also the opinion that

is such an important substance at Mohenjodaro that Jansen has published a book titled where street drains are absent. At Kalibangan, for

It is evident from the above description that
is such an important substance at Mohenjodaro that Jansen has published a book titledexample, there were soakage pits and jars for indithe street patterning was designed to catch the
from these finds, it is assumed that wells were an
the city wells have been a vital part of water man
example, there were soakage pits and jars for individual houses, but no street or public drains in the*Mohenjo-daro; City of Wells and Drains, Wasserluxus 4000 years ago.*
fresh breeze by those who were familiar with the vidual houses, but no street or public drains in the

Wheeler found

residential area. Public street drains were social organization of the Harappan
Wheeler found
also absent at Banawali (19). In both
city folk. Mackay observes that the



236

also absent at Banawali (19). In bothone of the most important case, however, street planning is in evi
features one of the most important case, however, street planning is in evithe features daro seems to have changed over of the IndusThe Antecedents of Steet Planning:

Civilization. He felt that the time. In the early days of the city it is

Civilization. He felt that the While the planned pattern of streets at

Great GreatWhile the planned pattern of streets atand thethe known Harappan settlements have

private,Bathas thereand seemthe to be no "extravagant provision for THE ANCIENT INDUS VALLEY been lauded and marveled, there has

pouring water over oneselfbathing" ina small pot.been lauded and marveled, there has the

pouring

havewater over oneselfbathing" innot been any attempt so far to examine In

In private homes private homes not been any attempt so far to examine Wast

been the refinement of shower:a small along one side of .

have been the refinementallowingof a kindanother person were both testimonies to the the origin and spread of this pattern of mto

the bathroom were both testimonies to the to ascend andcity planning in the Bronze Age era to ran alothe bathroom allowing another and pour

bathroomimportance of water in the city planning in the Bronze Age era touse. The rooms in which the wells and tervalsbather. bather. The watertight

The watertight bathroom

of pottery sherds but usually of baked bricks,importance of water in the Harappa,to achieveand checkeof pottery sherds but usuallywhich

perfect

fit; the floor

sloped other Indus cities belonged. It is true that

slightly life of the Indus people". aone corner, also raperfectwherefit; the floor slopedlife of the Indus people". the waterto flow one corner,

where

it ran away into the efficient drainage system

it ran away into the efficient Water was important in the some writers have casually considered

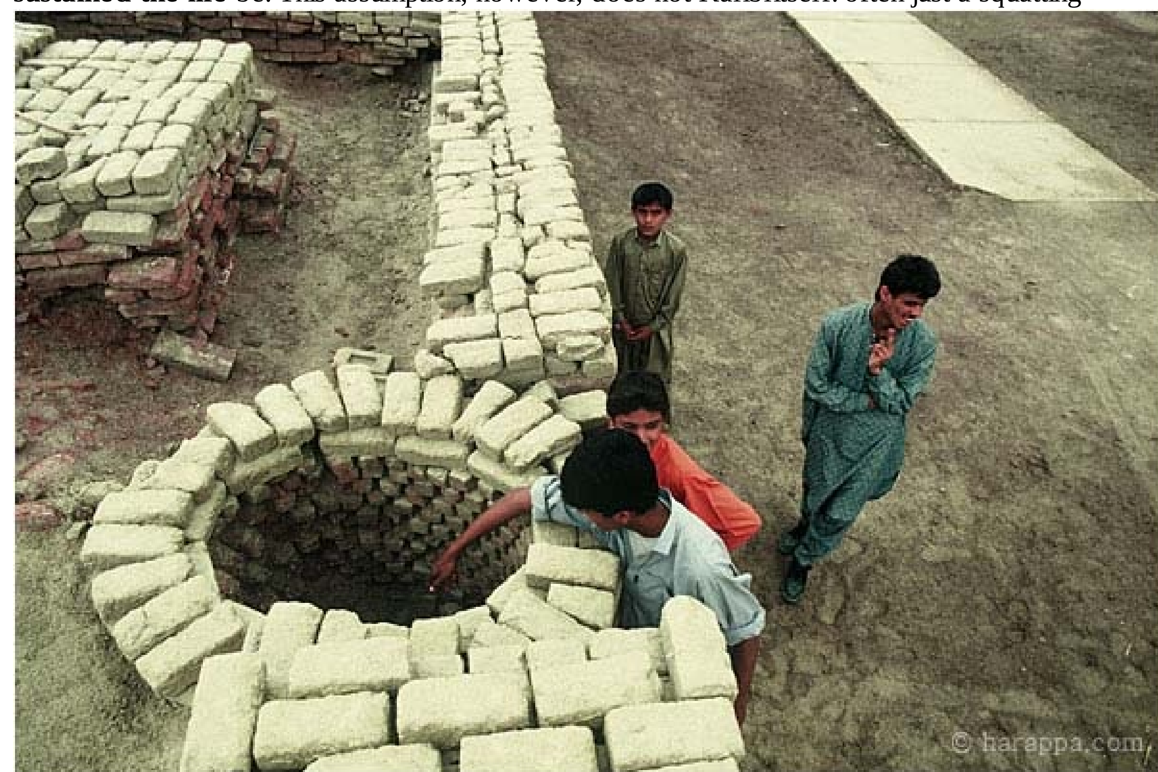
city, via ment, terra-cotta drainpipes Water was important in the this pattern, concluding that it spontane outskiterra-cotta drainpipes or drainage chutes. Drains

were often built into Indus Civilization in two Indus Civilization in two ously recommended itself to the town timeswere often built into the walls, so that they been set down. near streetin Harappa

Private Private latrines were present in almost every house ously recommended itself to the town drain~ probably

probably latrines were present ways. From a practical point jar let into ways. From a practical pointbuilders whoever or wherever they might common elsewhere. the floor provided : The public

common elsewhere. A large be. This assumption, however, does not itself: often just a squatting hole though some **of view, it sustained the life** be. This assumption, however, does not Kaliblitself: often just a squatting



hole
though
at Mohenjo-daro
some

with seats. Some of these jars were connected connected humans, by a drain with seats. Some of these jars were

Another public well at Mohenjodaro. This well and nearby walls
tem, and others had a small hole at the base

latrine in one house
Another public well at Mohenjo-daro. This well and nearby walls have

hold up in the light of the history of the street of hold up in the light of the history of the by a drainplants, plants, to the city sewage and water tanks at Dholavira and other to allow liquids known Old World civilizations. Only in carrya small hole at the base to allow animals. But it also played to drainaway. Theaway. The

in Banawali, known Old World civilizations. Only in which seems
Another public well at Mohenjodaro. This well and nearby walls to have the Indus Valley is this pattern in exis sew~have been covered with mud brick to protect them from salt in Banawali, animals. But it also played belonged
been covered with mud brick to protect them have been covered with mud brick to protect them from salt was provided
been covered with mud brick to protect them crystallization
crystallization
local climate and and environment and,

was provided with a washbasin. the Indus Valley is this pattern in exis pres~with a washbasin.an important symbolic role an important symbolic role as an essential part of the alol

as an essential part of the beer
local
important feature of every Harappanand,
for
the
the
purpose,

probably samesamepurpose,settlement, large or small, and thethe **Indus ideology. Clean, fresh water was provided to urban peoples from deep, brick-lined** a dtprobablyfor
house ventilations were opened on thewells. Dirty, polluted water was moved out of the houses of urban people by an lowl was well known throughout the rereg side of the main streets. Whether this side of the main streets. Whether this weIexpansive system of drains. was a factor in street planning or not,

was a factor in street planning or not,
the orientation of houses in certain di
the orientation of houses in certain di **Water for drinking and bathing was an important commodity in the rection appears to be a definite factor**
in the city planning. draw water from nearby rivers, as at **Harappan cities. Although nearby rivers may have provided water for some inhabitants,** The provision of public drainage **they could not have been convenient for the entire population. Depending on the**

thanThe provision of public drainage systemssystems at Harappan well**geographical setting, wells, reservoirs or cisterns were built within the cities to ensure known. Street drains, either covered or drinking and bathing water. At Mohenjodaro, for example, numerous wells were dug open, below street surface, conveyedthroughout the city and maintained for hundreds of years. These 10 to 15 meter deep**laid out, at least one of the wells at**waste from several houses to soakage**

wells were lined with specially made wedge-shaped bricks to form a structurally sound

dumpsdumpswells were lined with specially made wedge-shaped bricks to form a structurally sound
points
points
at
atlevel. There may also have been a
Mohenjo-daro.
Mohenjo-daro.

Side drains **cylinder that would not cave in under pressure from the surrounding soil. Some wells at** pool**could feed major drains at right angles.Mohenjo-daro are as small as 60 centimeters in diameter; one was as large as 2.1** Harappa.**The drains were often of substantial dimensions, say 60 cm deep and 25meters. The average is about 1 meter. From the technical point of view, the cylindrical cm wide, and carefully constructed ofwell shafts are an impressive feat of engineering as they bear out the fact that the baked brick. Interconnected drains of**

found outside villages or towns. An

this sort must have a sufficient downwardwardexample is the two wells at Allahdinoslopeto todischargedischargeeffectively.effectively.slope

When

When

which have been excavated by Fairsdrainsarearepublicpublicandandcollectcollect criss-crosses

drains **of brick-lined drains criss-crosses the area, running along the lanes between**ervis. One of these wells was dug on

waste from several houses and are fed buildings. buildings.
by branches, they would obviously have

bank of the Malir River near Karachi.

The opening is too small to lift the water by a bucket
an rope. It is brick-lined and only a small depth.
of this obsession of water. While wells were the chief source of fresh water supply for the Harappan

Page 275Page 275**A view of a small part of the water supply and drainage system at**
A view of a small partof the waterof the watersupply and drainagesupply and drainagesystem systemat Harappa.Toat Harappa.Toright is aright is a
well fromwell fromwhich which water waterwas drawn.was drawn.A networkA networkof brick-linedof brick-lined criss-crosses**Harappa.To the right is a well from which fresh water was drawn. A network**the

Since the level of water in such wells is higher than 297297of Punjab and Sindh, colected rain water seems to the surrounding water table for hydrological rea
sons, the excavator hypothesizes that these wells
were serving as artesian wells or water springs in
be main source of fresh water for Th.e inhabitants of Kutch and Saurashtra. For example, the area immediately inside the walls at Dholavira was taken up by at least sixteen enormous reservoirs that

associated with, or accessible to, the Indus Valley We therefore infer that the grid plan settlement in showed its existence in subsequent times. volved compulsory settlement of people according
showed its existence in subsequent times.
The earliest record of a gridiron pattern of
street planningThe earliest record of a gridiron pattern ofis that of
volved compulsory settlement of people according to state ordered norms. That is, grid plans reflect to state ordered norms. That is, grid plans reflect in thein Bronze AgeHarappan Civilization - The Material Culturethe existence of state implanted settlements. street planning the Bronze

Mohenjo-daro although some indication of incipient

Mohenjo-daro although some indication of incipient

town planning of this nature are at hand at some

covered about a third of the enclosed area of the

the existence of state implanted settlements. Corroborative data from various historical contexts support this interpretation. Gleave (26)Corroborative data from various historical contexts

solutions. Historical accounts provide glimpses of
support this interpretation. Gleave (26)shows thatshows that **Early Harappan sites of fourth millennium BC in**
settlement. These were found to have been exca
vated down to bedrock and in some cases cut into
Sindh and Baluchistan. Thus, it is possible that suchSindh and Baluchistan. Thus, it is possible that such
the rock itself, and they were surrounded by em
an idealized proposition of town planning could bean idealized proposition of town planning could be
bankments of earth faced with stone. Partly sup
based on the Early Harappan precedent as is surbased on the Early Harappan precedent as is sur
plied by rainwater, they were filled with water di
mised from the aerial photograph of Rehman Dherimised from the aerial photograph of Rehman Dheri
in western Punjab.in western Punjab.verted, by means of a series of dams, from two
in the early twentieth century many Yoruba people
many interesting and unique urban drainage tech
were encouraged to resettle in new locales by the
were encouraged to resettle in new locales by the The relation of modern engineering to ancient
British administration so that there may be better British administration so that there may be better
engineering is difficult to comprehend considering
vehicular traffic, services, and administrative facilivehicular traffic, services, and administrative facilities ties(not to speak of political control). The newthat modern engineering is so highly specialized and
(not to speak of political control). The new
towns had the same house types, crafts, markets
rules-of
towns had the same house types, crafts, markets
thumb, empirical equations, physics, numerical
and economy as did the old but they differed from



methods, computer simulators, and other engi



the old in that they were now laid on grid plans.the old in that they were now laid on grid plans.

Water Supply Systems: **One of the more**

innovativeinnovativeaspectsavailable to ancient engineers. Despite the suIndusInduscitycityplanningplanningnotnotaspectspreme technological advantage today, ancient **known from previous periods was its system of**

peoples have accomplished fantastic engineer

public works (6,7). Harappan engineers special

ing feats throughout history, sometimes rivaling**ized in many innovations that provided fresh water**

those of today. For example, several ancient

to their city dwellers and took care of the disposal

stone,

civilizations built magnificent cities ofof wastewater. Probably not until Roman times did brick, and wood and equipped the cities with

people devise so many clever construction techniques to deal with comforts and discomforts related to water. Although less elaborate wastewater lated to water. Although less elaborate wastewater

collection, and stormwater drainage. Further, in

disposal systems had been designed at settledisposal systems had been designed at settle

some instances infrastructures were integrated, ments in Syria and Iran about a thousand years ments in Syria and Iran about a thousand years earlier, it seems unlikely that the Hardpans knewearlier, it seems unlikely that the Hardpans knew

tion. The Harappan society especially excelled **about them (8). Even if they did, the Hardpans did** it much better.it much better.in these feats of engineering and town planning. Urban drainage is defined to include two types of fluids:

Water played a vital part in the life of theWater played a vital part in the life of the

wastewater and stormwater. **A water reservoir at Lothal, Gujarat**

A water reservoir at Lothal, Gujarat

seasonal streams that flowed

past the settlement. A complex Not all Harappan cities were
Not all Harappan cities were
founded on virgin soil: most of them,
system of catchment areas and
founded on virgin soil: most of them,in fact, arose on the ruins of the old
drains also collected rainwater
in fact, arose on the ruins of the oldsettlement. The question arises that
from the citadel and channeled it
settlement. The question arises thatif the grid plan was introduced at a
into stone chambers. Two other
if the grid plan was introduced at asettled for genera
place
reservoirs were constructed ad
tions,alreadyitssettledimplementation

jacent to the citadel, one of them for generawouldtions,implementation wouldmean a disruption in the lives of the
pre-existingmean a disruption in the lives of theThe grid
pre-existingflight of thirty-one steps allowinggrid pattern does not take shape gradu

the inhabitants to descend to its
pattern does not take shape gradually and a grid-plan town is not con
foot. The reservoirs were care
fully
ceivablemaintainedexceptbyally and a grid-plan town is not con‘organic
removing
ceivable
accumulated silt and rein- forc
except
as
an
‘organic
whole' (24), coming into being only
whole' (24), coming into being only

ing their walls. Satellite images when a regulating authority decides
when a regulating authority decides on the layout of streets and the allo
on the layout of streets and the allocation of house plots. Thus for the

city in the area of the cemetery.old inhabitants the new plan would
cation of house plots. Thus for the





The enormous reservoirs are the most striking feature in the city of Dholavira.

old inhabitants the new plan would have meant a termination of existing **Steps down the side gave access to the water held in them.**

tems:house plot demarcations or owner **The enormous reservoirs are the most striking feature in the city of Dholavira.** have meant a termination of existing **Steps down the side gave access to the water held in them.**

age systems have been viewedship. Houses would now have to be

house plot demarcations or owner

with various perspectives. Duringrebuilt on new plots (at Kalibangan) or house plots

ship. Houses would now have to be

Harappan people, and they were skilled hydraulic

Wastewater is water that after use for life support,

different time periods and in different locations, ur Chanhu-daro). Harappan people, and they were skilled hydraulic engineers. Nowhere is the sophisticated town plan rebuilt on new plots (at Kalibangan) or house plots industrial processes, or life enhancement must be would

ban drainage has been considered a vital natural have to be Stanislawski (24) points out that rectangular blocks ning in Harappan cities more impressive than in the

re-aligned (at Chanhu-daro). engineers. Nowhere is the sophisticated town plan resource, a convenient cleansing mechanism, an of houses are inconvenient for house owners in collected and disposed of appropriatetely to prevent structural features relating to the supply of water efficient waste transport medium, a flooding con

Stanislawski (24) points out that rectangular blocks nuisances and polluted conditions from developing
terms of light and air. But a chessboard plan allows and the disposal of the affluent. It seems as though

cern, a nuisance wastewater, and a transmitter of for the rapid building of a town, being easy to layout
terms of light and air. But a chessboard plan allows
disease. In general, climate, topography, geology, with simple measuring instruments, and for easy

for the rapid building of a town, being easy to layout
scientific knowledge, engineering and construction
with simple measuring instruments, and for easy
capabilities, societal values, religious beliefs, and

other factors have influenced the local perspective of urban drainage. For as long as humans have been constructing cities these factors have guided and constrained the development of urban drainage 298
of houses are inconvenient for house owners in structural features relating to the supply of water

in urban areas. Stormwater is runoff produced by
and the disposal of the affluent. It seems as though the Harppans were obsessed with water. Jansen
precipitation. Both wastewater and stormwater must
has termed this love affair of the Harappans with the Harppans were obsessed with water. Jansen be considered during urban drainage system planhas termed this love affair of the Harappans with
ning. Historically the two waters have been com

bined into a single conduit, or have been kept sepa298rate during collection and disposal. There is indi
cations that no Bronze Age civilization has even tried to dispose off the spent waters separately. So

Some researchers have recently questioned the significance of a ‘gridiron layout’ of the (7). Harappan cities and towns. They point out that there is no actual proof for the famous date. Wheeler found *wasserluxus* one of the most the Harappan people followed a tradition which their predecessors evolved through the *Wells:* Wells have been discovered in large important features of the Indus Civilization. He felt

'grid pattern'. Only the north-south axis of First Street is evident at Mohenjodaro. The
Ancient Pakistan - An Archaeological HistoryHarappan cities, such as Mohenjo-daro andsecond axis to the east is not proved, All other streets turn corners and do not fit into a
that the Great Bath and *Wasserluxus* Some researchers have recently questioned the significance of a 'gridiron layout' of the up in every Harappan settlement investigated toHarappa, as well as in small towns, such as Al
(7).
'gridiron lay-out'. The same system of 'turning corners' may be recognised on enteringdate. systems as providing the dual purposes of waste
Harappan cities and towns. They point out that there is no actual proof for the famous lahdino. These were constructed with specially de
the houses. In general there are no straight axes to enter. Indeed, a review of published and*Wells:*stormwater Wells have been discovered in largeInretrospect,
the Harappan meticulously collected the wastewater they
Harappan cities, such asMohenjo-darosigned wedge-shaped bricks, which were placed
excavation plans reveals that the vast majority of the gridiron layout at Harappan sites isviewed urban runoff as a nuisance flooding conand second axis to the east is not proved, All other streets turn corners and do not fit into a Harappa, as well as in small towns, such as Alwith their smaller end facing toward the center ofthat the Great Bath andsystem s for its disposal, they used the stormwater
tion in two ways. From a practical point of view, itrepresented by dotted lines through un-excavated areas rather than the solid lines ofcern, waste conveyor, and a vital natural resource.
the houses. In general there are no straight axes to enter. Indeed, a review of published the well. Built in this way, wells were able to with
as a resource, that is, to cleans their streets of deactually excavated streets. One cannot help questioning to what extent the presumedsigned wedge-shaped bricks, which were placedThe Persians were another ancient civiliza
stand lateral pressure
posited scum and debris.people". Water was important in the Indus Civilizaexcavation plans reveals that the vast majority of the gridiron layout at Harappan sites istion that constructed urban drainage systems. The
with their smaller end facing toward the center of
represented by dotted lines through un-excavated areas rather than the solid lines ofancient when they were sunk intourbantion in two ways. From a practical point of view, it the well. Built in this way, wells were able to withPersiansconsidered
the ground. A large num
actually excavated streets. One cannot help questioning to what extent the presumed stand lateral pressurerunoff sacred and enacted laws to



when they were sunk
intoprotect it from pollution. Pollutingber of wells were apparthe ground. A large numsunk
ber of wells were apparin each city
sin. Moreover, rainwater and urban
ently
sunk
and town, mostly private in each city
and town, mostly privaterunoff were collected in cisterns for but some also in public
potable uses. Deep wells injected but some also in public domain. This is probably domain. This is probably clearest at Mohenjo-darounderlying aquifer. The Persian perspective of
clearest at Mohenjo-daro
and Harappa where wells, and Harappa where wells,urban runoff was clearly as a
vital syselaborateelaborate sysdrainagenatural resource. Unfortunately, as
tems, and residential tems, and residential
time passed changes in the Per
bathing facilities in virtubathing facilities in virtu
sian attitudes and behavior con
ally all the houses distin
tributed
to
guish the Indus Civiliza pollution ally all the houses distinprob
lems and the eventual downfall ofguish the Indus Civiliza
tion from all other civiliza

tions of the Bronze Age. tion from all other civilizaAt Mohenjo-daro, for exsame attitude seems to prevail in ample,

tions of the Bronze Age.
Indusnumeroussettlements of Lothal were dug throughout the At Mohenjo-daro, for ex
city
and

ample,and Dholavira, where stormwater
maintainednumerous wells
was kept separate from the Town Planning
!
hundreds of years. Somewere dug throughout the wastewater **and** collected into a city maintained for series of reservoirs and tanks for later use.hundreds of years. Some
A Monhenjo-daro street with drain along the side of theA Monhenjodaro street with drain along he side of the thoroughfare
equipped with manholes, and sometimes
thoroughfare Town Planning**!**
flowed into soakage pits, but nothing is
A Monhenjodaro street with drain along he side of the thoroughfare

A Monhenjo-daro street with drain along the side of the existence of a gridiron street plan has influenced the placing of these "dotted line" equipped with manholes, and sometimes

streets through unexcavated areas. The existence of a cultural norm prescribing the

flowed into soakage pits, but nothingThe house drains generally orientation of all buildings according to the cardinal directions would of itself produce a is

superficial "gridironconnected to medium-sized open drains in pattern," without the existence of centralized authority or a existence of a gridiron street plan has influenced the placing of these "dotted line"

sustained the life of humans, plants, and animals.known of their final discharge on the edge

streets through unexcavated areas. The existence of a cultural norm prescribing the
But it also played an important symbolic role as an
orientation of all buildings according to the cardinal directions would of itself produce a from essential part of the Indus ideology. Clean, freshwere covered with bricks or dressed stone
superficial "gridiron pattern," without the existence of centralized authority or a
water was provided to urban peoples from deep,

developed sense of town planning. the side streets. These open drains flowed

arranged according to a plan and that the urban

out of the houses of urban people by an expansiveinto larger sewers in the main streets which

Such a criticism may be valid if not carried too far to become absurd. It would certainly
system of drains.voirs and cisterns were built within the cities to enuntil they finally exited under the city wall.

were covered with bricks or dressed stone

residencesAt Mohenjodaro drains were found at all con

water for the inhabitants of some cities, it could notblocks. Corbelled arches allowed the larger

levels of the site. They seem, therefore, to

have been convenient for the other locations. Dedrains to cut beneath streets or buildings

pending on the geographical setting, wells, reser
constructed above ground of burnt brick (see the
another

until they finally exited under the city wall.

voirs and cisterns were built within the cities to en
technology
sure drinking and bathing water. Taking Mohenjoof these connected to the drainage channels, wastewater that was collected rain water through an elaborate system of

daro as an example, fresh water was supplied by aAt Mohenjodaro drains were found at all

Stage. ers. First, the wastewater was passed through ta

network of wells, sunken cylindrical shafts severallevels of the site. They seem, therefore, to

meters deep built of wedge-shaped, standard-sizepered terra-cotta pipes into a small sump. Solids

bricks. At other locations, such as those in Kutchhave been made at the very beginning of the

uids overflowed into the drainage channels in the

and Saurashtra, water supply was ensured throughanother that the evidence of these installations has turned an extensive inventory of water reservoirs whichpeoples that was



A middle-of-the-road drain, covered with
A middle-of-the-road drain, covered with bricks at bricks at Harappa

technology of

The drainage channels could be covered by bricks
Mohenjodaro there are some drains where collected rain water through an elaborate system ofand cut stones, which likely were removed during

developed in the important Transitionalthe bottom was made of gypsum and lime plaster with sides of baked brick. In most channels and diverters. Given the state of technol299 Stage. esting feature of the channel was the inclusion of aogy in other Bronze Age cultures, it is all the moreinstances ordinary brick was used, but specially dressed brick was noted in some areas. cunnette (14). The cunnette was probably conFor instance, specially shaped bricks were used to form the gently rounded corners of The structed to convey the smaller flows associated withat astonishing that the Harappan urban phase seems
to have been accompanied by fully developed, builtmost sites weredrains. The integrity of the drains wasdaily wastewater discharges, while the entire chan

in water supply and affluent disposal systems, and

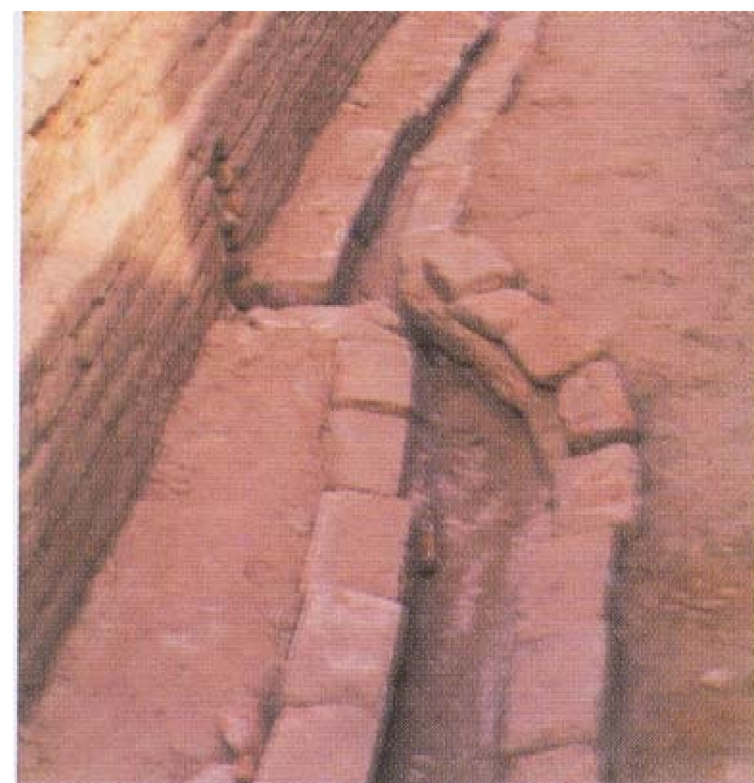
generally made of baked brick, although the

achieved by closely fitting the bricks with a
A middle-of-the-road drain, covered with
A middle-of-the-road drain, covered with bricks at nel would only be used during wet weather events.

that the evidence of these installations has turned bit of mud mortar. Dressed bricks made the one at Overall, the Indus civilization viewed urban drainageAllahdino is of stone. At bricks at Harappa fit even better. At Harappa a sequence of Mohenjodaro there are some drains where 277

four drains, built one after the other, has

the bottom was made of gypsum and lime plaster with sides of baked brick. In most


299

instances ordinary brick was used, but specially dressed brick was noted in some areas.

Harappan Civilization - The material culture
Harappan Civilization - The Material Culture
It is evident from the above description that stone. Partly supplied by rainwater, they were filled
the city wells have been a vital part of water manThe Mesopotamian Empire states of Assyriawith water diverted, by means of a series of dams,larger drains to cut beneath streets or buildings untilagement system and reflects on the

social organifrom two seasonal streams that flowed past the set
zation of the Harappan city folk. Mackay observes and Babylonia marked great advances in civilizationtlement. A complex system of catchment areas andthey finally exited under the city wall. Drains were

that the social context of wells at Mohenjo-daroAncient Pakistan - An Archaeological Historydrains also collected rainwater from the citadel and
during the second millennium BC. The ruins from

was considered a sin. Moreover, rainwater and urban
Mesopotamian cities contain well-constructed storm
ness as a taboo, not because of the physical unclean
voirs were constructed adjacent to the citadel, one
ness but the moral evil it suggested (10).
found at all levels of the city. They seem, therefore,
seems to have changed over time. In the early days channeled it into stone chambers. Two other reser
of the city it is probable that the wells were mostly to have been made at the very beginning of the set
runoff were collected in cisterns for potable uses. Deepprivate, as there seem to be no means of reaching
wells injected urban runoff into the underlying aquifer.
drainage and sanitary sewer systems. For example,
Like street planning, the elaborate drainage sys
of them more than 5 meters deep, with a flight oftlement and may have developed in the important
them from the street, but later on, as the population thirty-one steps allowing the inhabitants to descend
The Persian perspective of urban runoff was clearly as the ancient cities of Ur and Babylon, located in pretem is another unique feature of the Harappan Civiliza
grew, they were thrown open to public use. The to its foot. The reservoirs were carefully maintainedTransitional Stage. Drains carrying rainwater werea vital natural resource. Unfortunately, as time passedrooms in which the wells were situated were, as a tion. At Mohenjo-daro, below principal streets and many
sent day Iraq, had effective drainage systems for by removing accumulated silt and rein- forcing their

changes in the Persian attitudes and behavior contriblanes ran a drain, 1 to 2 ft deep, covered with bricks or kept separate from those used for wastewater andrule, carefully paved, and the floor in many cases walls. Satellite images indicate that there was an
uted to water pollution problems and the eventual stones, and provided with sumps and inspection traps
downfall of the civilization. More or less the same attiwas worn into deep depressions where countless sewage. The largest
drains and culverts had corwater-jars had been set down. at regular intervals. The waste water and other sewage

tude seems to prevail in the Indus settlements of Lothalsewers and drains for household waste and gutters of the cemetery.of almost every house was channeled into the drainbelled roofs; a particularly impressive example is and Dholavira, where
stormwater was kept separate: The public display or use **Sewage**running along the street outside, sometime in the mid
of water, such as the Great Bath at Mohenjo-daro
from the wastewater and collected into a series of resdle of the road and sometime along the side. Altogether,
ervoirs and tanks for later use.
and the water tanks at Dholavira and other KutchiTown Planningvarious perspectives. During different time periods
!the extent of the drainage system and is remarkable,
and drains specifically for surface runoff. The mateurban drainage systems have been viewed withthe drain running from the Great Bath at Mohenjo



Construction details of an underground drain at Harappa

Construction details of a underground drain at Harappa (after Kenoyer)

(Kenoyer)

daro. Such drains are a feature of many Harappan settlements but not of all. Kalibangan, for example, had no drains; instead sunken soakage jars along the streets were used. At Lothal there were both drains and soakage jars.

The street drains at most sites were generally made of baked brick, although the one at Allahdino is of stone. At Mohenjodaro there are some drains where the bottom was made of gypsum and lime plaster with sides of baked brick. In most instances ordinary brick was used, but specially dressed brick was noted in some areas. For instance, specially shaped bricks were used to form the gently rounded corners of drains. The integrity of the drains was achieved by closely fitting the bricks with a bit of mud mortar.

Dressed bricks made the fit even better. At

The Mesopotamian Empire states of Assyria and and together with its straight streets give the HarappanHarappa a sequence of four drains, built

sites is another manifestation of this obsession ofwere used instead. These were positioned under the and in different locations, urban drainage has been

Babylonia marked great advances in civilization during cities a character of their own.

At Mohenjo-daro, some of the street drains were

water supply for the Harappan of Punjab and Sindh,

one after the other, has been found exiting

the second millennium BC. The ruins from Mesopotavertical toilet chute outside the house and had to be considered a vital natural resource, a convenient the city at the main gateway. Some drains mian cities contain well-constructed storm drainage andtipped out regularly. In some cases they were fixed cleansing mechanism, an efficient waste transport

equipped with manholes that were used for regular

medium, a flooding concern, a nuisance wastewaknown of their final dissanitary sewer systems. For example, the ancient cities cleaning. Nothing is, however, appear to have been provided with wooden sluiceof Ur and Babylon, located in present day Iraq, had efpermanently into the wall so that their contents hadter, and a transmitter of disease. In general, climate,

charge on the edge of the city. AS indicated above, the gates or perhaps a grill to keep people or wild ani
systems
the walls at Dholavira was taken up by at least six
to be scooped out. Yet other vessels had perforated housetopography,drainsgeology, scientificconnectedknowledge,fective drainage
systems for stormwater control. Therashtra. For example, the area immediately inside
and irrigation uses. The Babylonians were partially
generally
neering and construction capabilities, societal val
teen enormous reservoirs that covered about a third mals out from entering into the walled city. household waste and gutters and
drains specifically for motivated to construct urban drainage systems by ues, religious beliefs, and other factors have influ
flowed into larger sewers in the main streets which were
surface runoff. The material of choice was baked brick covered with bricks or dressed stone blocks. Corbelled Wastewater was
collected into small open with an asphalt sealant. Rainwater was also collectedDrains were often reused from building period
toas long as humans have been constructing cities
or buildings until they finally exited under the city wall.
for household and irrigation uses. The Babylonians drains in the lanes and flowed into the main drain building period at
Mohenjodaro. This was done by these factors have guided and constrained the de
Drains were found at all levels of the city. They seem,
were partially motivated to construct urban drainage
surrounded by embankments of earth faced with velopment of urban drainage solutions. Historical age system. Drains, usually
of closely fitted baked systems by their desire to remain clean. The Babylonisimply raising the walls with more bricks. At
thetherefore, to have been made at the very beginning of

a taboo, not because of the physical uncleanness
ans, like the Hardpans before them, viewed uncleanli southern end of the First Street in DK-G, the walls
but the moral evil it suggested (10). tant Transitional Stage. Drains carrying rainwater were

the settlement and may have developed in the impor bricks, ran along the main streets, covered by large of a drain
were repaired and raised at least twice. In

Like street planning, the elaborate drainage
its last construction phase this drain was 42
system is another unique feature of the Harappan

centimeters wide, but 2 meters deep in places. Most principalof the drains had brick or stone covers because they below
streets and many lanes ran a drain, 1 to 2 ft deep,
covered with bricks or stones, and provided with
laid flat across the sidewalls, although bricks laid on

sumps and inspection traps at regular intervals. The
baked bricks or stone slabs. At intervals there were inspection covers so that the free flow of the drains

Civilization. At
Mohenjo-daro, could be checked and maintained. Again, this type of street drains are quite common in small cities and towns of Pakistan. As the street level rose, the sides

of the



drains were also raised with additional edge across the channel are also well documented. Close-up view of ground floor drain courses of bricks, so that, over the life of the settlewaste water and other sewage of almost every

The wider drains were covered with large limestone outlet from the street side, showing a ment, the drains might come to be several meters house was channeled into the drain running alongbrick on edge with a notch was placed blocks quarried from the nearby Rohri Hills. These deep. Brick culverts on the outskirts of the city althe street outside, sometime in the middle of theacross the drain hole to keep objects blocks are especially common on the Mound of the

road and sometime along the side. Altogether, the extent of the drainage system and is remarkable, and together with its straight streets give the Harappan cities a character of their own.

At Mohenjo-daro, some of the street drains were equipped with manholes that were used for regular cleaning. Nothing is, however, known of their final discharge on the edge of the city. AS indi cated above, the house drains generally connected to medium-sized open drains in the side streets. These open drains flowed into larger sewers in the main streets which were covered with bricks or dressed stone blocks. Corbelled arches allowed the from flowing out with the bath water lowed the drains to discharge outside the walls;

sometimes these had a sluice or grille, to catch solids or to prevent the use of these drains as illicit entrances into the city.

Sewage ran along a general depression in the street until finally, fifty to a hundred years later, the city once again took control and built new drains directly above the old ones. These fluctuations in street and drain maintenance resulted in the rapid build up of street levels. Many doorways and walls had to be raised above the level of the street to keep sewage from flowing into the house. Eventually, entire rooms would be filled with dirt and a new

of the city. The house drains generally Town Planning!



probable that the wells were

connected to medium-sized open drains in
Town Planningample, several ancient civilizations built magnificent
thrown open to public use. The

cities of stone, brick, and wood and equipped themostly private, as there seem to equipped with manholes, and sometimes rooms in which the wells were situated were, as a rule, carefully paved, and the floor in including the side streets. These open drains flowed Ancient Pakistan - An Archaeological Historycities with sophisticated infrastructurebe no means of reaching themflowed into soakage pits, but nothing is many cases was worn into deep

depressions where countless water-jars had been set from the street, but later on, as

into larger sewers in the main streets which complished fantastic engineering feats throughout down.The use of specially formed bricks for the construction of

were covered with bricks or dressed stone known of their final discharge on the edge wells
blocks. Corbelled arches allowed the larger of the city.It is generally believed that these narrow
The house drains generally

drains to cut beneath streets or buildingswells were the invention of the Harappans history, sometimes rivaling those of today. For ex

the population grew, they were

ample, several ancient civilizations built magnificent

thrown open to public use. The

cities of stone, brick, and wood and equipped the

until they finally exited under the city wall. connected to medium-sized open drains in rooms in which the wells were situated were, as a rule, carefully paved, and the floor in of the alluvial plain. This statement is true cities with sophisticated infrastructure includingthe side streets. These open drains flowed

only in its general sense because some signs
of well digging and their lining with bricks

levels of the site. They seem, therefore, to were covered with bricks or dressed stone Indushave been made at the very beginning ofare already in view in late Early blocks. Corbelled arches allowed the larger It is generally believed that these narrow

the
Indus
period in southern Baluchistan (Kauri Buthi,

drains to cut beneath streets or buildingswells were the invention of the Harappans technology of these peoples that was of the alluvial plain. This

statement is true developed in the important TransitionalSewage System: One ofuntil they finally exited under the city wall. most only in its general sense because some signs

Stage.
remarkable features of Mohenjodaro and

At Mohenjodaro drains were found at all of well digging and their lining with bricks
are already

most
sites
were

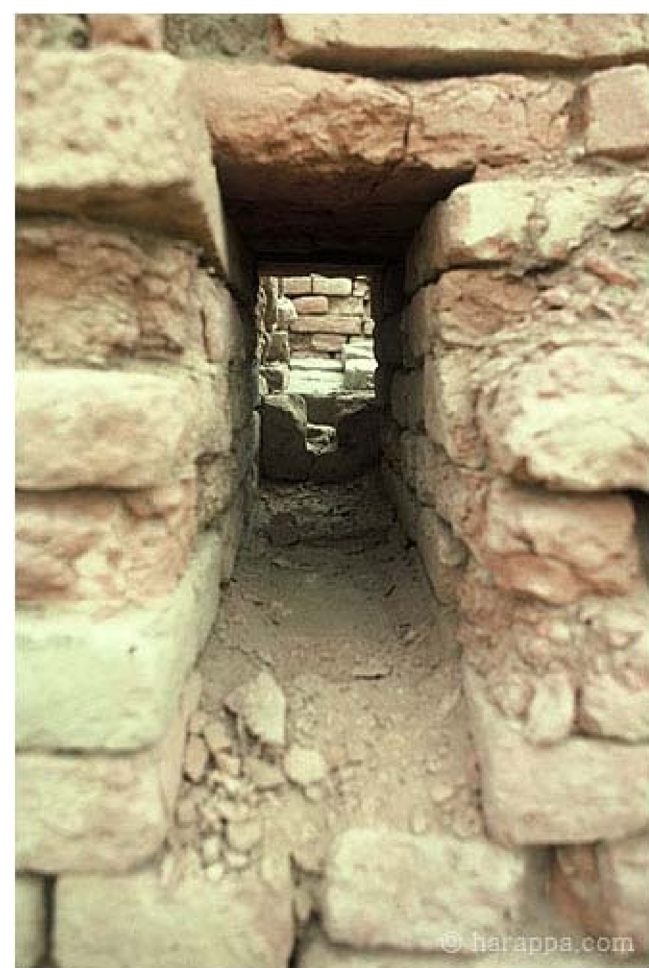
in view in late Early

Harappa, Kalibangan, Nausharo, Chanhu

have been made at the very beginning of many cases was worn into deep depressions where countless water-jars had been set
At Mohenjodaro drains were found at all into larger sewers in the main streets which



The



street several other Harappan settlements (e.g., levels of the site. They seem, therefore, to Indus
generally made of baked brick, although the daro, Allahdino, Dholavira) is their city period in southern Baluchistan (Kauri Buthi, A middle-of-the-road drain, covered with one the Indus cities and of maystone.be another bricks at Harappa for example). drainage system. The fact that even small technologyMohenjodaro there are some drains where that was towns and villages have impressive drainage
Close-up view of ground floor drain outlet fromSewage of the most the bottom was made of gypsum and lime plaster with sides of baked brick. In most developed in the important TransitionalSystem: One the street side, showing a brick on edge with a andinstances ordinary brick was used, but specially dressed brick was noted in some areas.Stage. notch was placed across the drain hole to keepremarkable features of MohenjodaroFor instance, specially shaped bricks were used to form the gently rounded corners of across the drain hole to keep objects the daily
drains several other Harappan settlements (e.g., of the drains wasThe street Many of the lanes and streets, especially at at most sites wereHarappa, Kalibangan,

Nausharo, Chanhuintegrity
from flowing out with the bath water had brickdaro, Allahdino, Dholavira) is their city achieved by closely fitting the bricks with a

Page 280

generally made of baked brick, although the A middle-of-the-road drain, covered with
one at drains, covered over by bricks or sometimes of stone. At drainage system. The fact that even small bit of mud mortar. Dressed bricks made the Allahdino fit even better. At Harappa a sequence of stone slabs, into which the house drains Close-up view of ground floor drain towns and villages have impressive drainagefour drains, built one after the other, has Close-up view of ground floor drain outlet fromsystems indicates that removing polluted the bottom was made of gypsum and lime plaster with sides of baked brick. In most
outlet from the street side, showing a soak pits or urns. The street drains were been found exiting the cityA street drain at Harappa. The drain was origi

the street side, showing a brick on edge with a at the main

brick on edge with a notch was placed
water and sewage was an important part of instances ordinary brick was used, but specially dressed brick was noted in some areas.

gateway. Some drains appear to have been

For instance, specially shaped bricks were used to form the gently rounded corners of the dailyacross the drain hole to keep objects Page 278
Many of the lanes and streets, especially at drains. Theof the
from flowing out with the bath water had
integrityperhaps a grill to keep people out from drains was Mohenjodaro and Harappa, secretly entering into the walled city. brickachieved by closely fitting the bricks with a Page 280 drains, covered over by bricks or sometimes bit of mud mortar. Dressed bricks made the

Besides the closed sewage installations for 

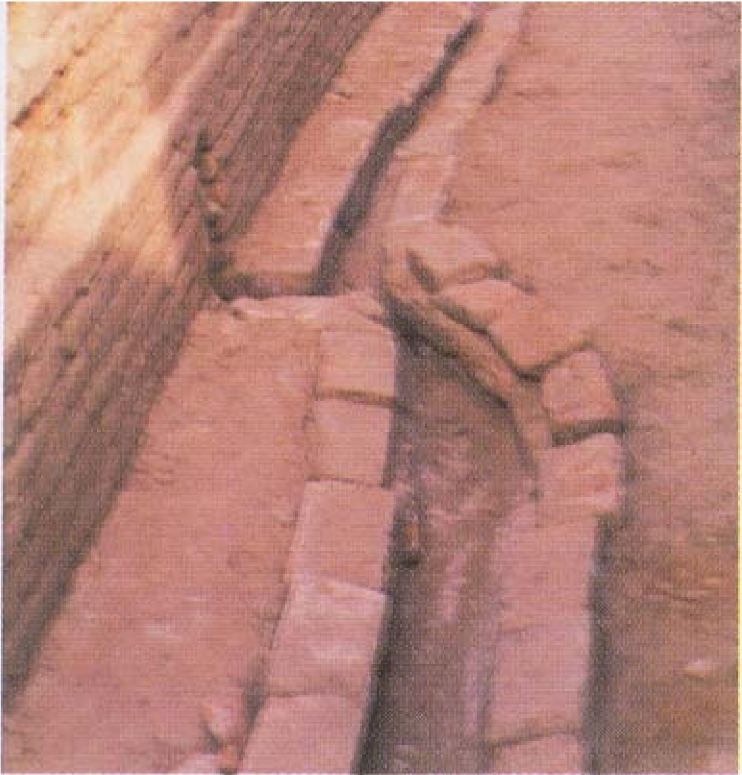
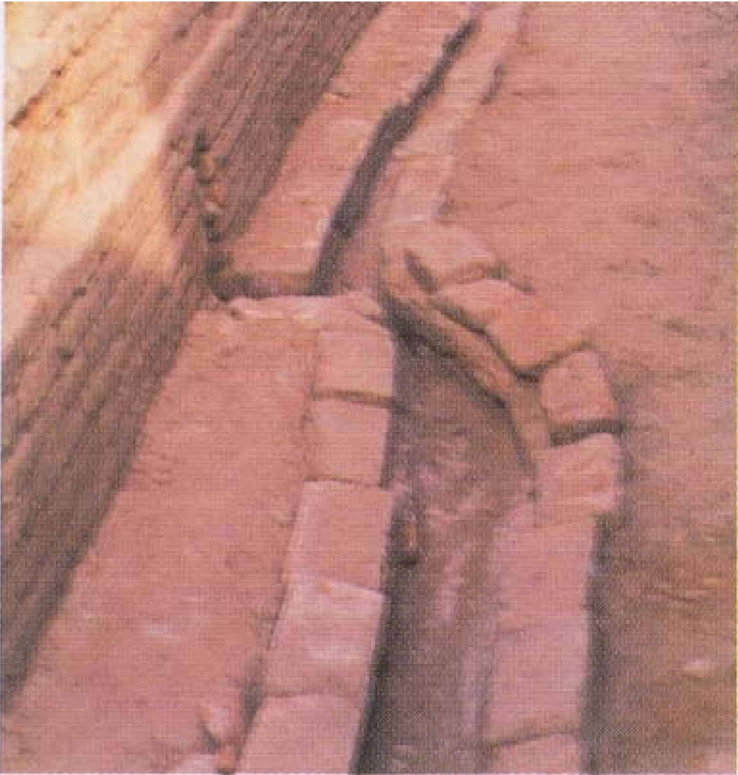
stone slabs, into which the house drainsfit even better. At Harappa a sequence of flowed, while others led directly into large four drains, built one after the other, has soak pits or urns. The street drains were

where small lanes opened onto

been found exiting the city

A street drain at Harappa. The drain was origi

bigger at the main



streets.

They had to be cleaned of settled **nally covered**nally covered.

gateway. Some drains appear to have been ·

A street drain connected to a house at the
A street drain connected to a house at the left,
left, Mohenjodaro
Mohenjodaro
deposits from time to time. In places where

provided with wooden sluice gates or

the street drain was too far away from the

perhaps a grill to keep people out from

house, closed sewage catchment vessels

secretly entering into the walled city.

accounts provide glimpses of many interesting and
unique urban drainage techniques.

The relation of modern engineering to ancient engineering is difficult to comprehend considering that modern engineering is so highly specialized and technologically advanced. Design rules-of thumb, empirical equations, physics, numerical methods, computer simulators, and other engineer

ing tools taken for granted today were not available

A street drain connected to a house at the left,
to ancient engineers. Despite the supreme techno
left, Mohenjodaro
logical advantage today, ancient peoples have ac

Besides the closed sewage installations for disposing of domestic effluent, open soak pits were also in common use, especially where small lanes opened onto bigger streets. They had to be cleaned of settled



deposits from time to time. In places where the street drain was too far away from the

A terracotta sectional sewage drain pipe at Mohen

house, closed sewage catchment vessels

accounts provide glimpses of many interesting andPage 279 unique urban drainage techniques. 302[279]

The relation of modern engineering to ancient engineering is difficult to comprehend considering that modern engineering is so highly specialized

house built well above the street level. Over hundreds of years this process of mound buildup raised the entire city high above the original plain level.

Drains were often reused from building period to building period at Mohenjodaro. This was done by simply raising the walls with more bricks. At the southern end of the First Street in DK-G, the walls of a drain were repaired and raised at least twice. In its last construction phase this drain was 42 centi

drainage system like
Harappan Civilization - The material culture that at Mohenjodaro and

meters wide, but 2 meters deep in places. Most of Harappan Civilization - The material cultureHarappa is not present everywhere else, barring the drains had brick or stone covers because they
were under the street or ground surface. The most
some segments which are clearly visible in the Harappan cities of Kutch and Saurashtra. Kaliban

distribution
distribution
systems,
systems,
drainage.
gan does not have drains running along the side of
esting feature of the channel was the inclusion of a

provement on what we frequently observe in most of the small cities and towns of modern Pakistan where the sewage just let fall down uncovered to the open drain in the street. The illustration on the next page should give the reader a flavor of the drainage technology during the Harappan period and a visual comparison with the modern one.

It must be mentioned here that an efficient
roads, water supply and
roads, waterfrequent cover was simply an ordinary baked brick wastewater collection, **and**
laid flat across the sidewalls, although bricks laid onand **stormwater**wastewater
Further, in some instances infrastructures were indrainage. edge across the channel are also well documented.
Further, in some instances infrastructures were in
tegrated, as was often the case with wastewater
tegrated, as was often the case with wastewater
collection. Theblocks quarried from the nearby Rohri Hills. These**society especially**ex
Harappan exblocks are especially common on the Mound of the
celled in these feats of engineering and town plan
ning.Great Bath.ning.
"The sophistication of a civilization can of
"The sophistication of a civilization can of
ten be judged by its attention to the issue of

ten be judged by its attention to the issue of
drainage infrastructure,..."
drainage infrastructure,..."
Wright, K.R. and Valencia Zegarra, A. In *Machu Pic*
Wright, K.R. and Valencia Zegarra, A. In *Machu Pic*
chu: A civil engineering marvel
cunnette
cunnette
structed to convey the smaller flows associated with structed to convey the smaller flows associated with
earthen jars, strategically placed along the streets. daily wastewater discharges, while the entire chan
These jars were regularly cleaned and the sludge
daily wastewater discharges, while the entire chan
nel would only be used during wet weather events.
carried out of the city. This awkward arrangement
Overall, the Indus civilization viewed urban drainage Overall, the Indus civilization viewed urban drainage
was most likely done for reason of the general gra
systems as providing the dual purposes of waste systems as providing the dual purposes of waste
dation of the city. Nevertheless, no matter what sort and stormwater conveyance. In retrospect, they and
viewed urban runoff as a nuisance flooding con
stormwaterof drainage system was employed, the residentialIn retrospect, they
houses of almost all the excavated Indus cities were
viewed urban runoff as a nuisance flooding con
cern, waste conveyor, and a vital natural resource.
connected to a sewage removal system.
The Persians were another ancient civiliza The Persians were another ancient civiliza
To summarize, there are four types of public
tion that constructed urban drainage systems. The tion that constructed urban drainage systems. The
drainage systems in the Harappan cities so far ex
cavated:**ancient Persians considered urban runoff sacred**
and enacted laws to protect it from pollution. Pollut
and enacted laws to protect it from pollution. Polluting water in Persia was considered a sin.
Moreover, ing water in Persia was considered a sin. Moreover,
or side of the street, just like that common in most
rainwater and urban runoff were collected in cisof the Pakistani villages and small towns. These
(14). The cunnette was
(14). Thethe streets. Instead, sewage was caught in largewas
probably con
probably con
Urban drainage is Urban drainage is
defined to include Town Planning**!**rainwater and urban runoff were collected in cis
defined includeTown Planning**!**
types of fluids: wastewater and stormwater. WasteBesides the closed sewage installations for to two

types of fluids: wastewater and stormwater. Wastedisposing of domestic effluent,

open soak pits were public drainage systems: **public drainage systems:**

water is water that after use for life support, indus
also in common use, especially where small lanes

trial processes, or life enhancement must be colopened onto bigger streets. They had to be cleaned
trial processes, or life enhancement must be col**lected and disposed of appropriatetely to prevent**

1) The drain runs in the open in the middle or
in urban areas. Stormwater is runoff produced by side of the street, just like that common in
in urban areas. Stormwater is runoff produced by side of the street, just like that common in

precipitation. Both wastewater and stormwater must

used instead; they did not connect with any drain most of the Pakistani villages and small

be considered during urban drainage system planning. Historically the two waters have been com age network. These were positioned under the ver

ning. Historically the two waters have been comgenerally paved bined into a single conduit, or have been kept sepa

bined into a single conduit, or have been kept sepa

rate during collection and disposal. There is in indiwith baked bricks or with shaped stone. tipped out regularly. In some cases they were fixed

rate during collection and disposal. There is in indications that no Bronze Age civilization has even
cations that no Bronze Age civilization has even

2) The drain runs under-ground, paved with
2) The drain runs under-ground, paved with

was the case with the Harappan Civilization. While

the Harappan meticulously collected the wastewater bricks or stone, and covered with large

the Harappan meticulously collected the wastewater
in their cities and constructed elaborately designed
rubbish could be thrown; more than two hundred

system s for its disposal, they used the stormwater
system s for its disposal, they used the stormwater **as a resource, that is, to cleans their streets of de**have been found. Immediately to the north of the

3) The drainage

posited scum and debris.

consists of large earthen

consists of large earthen

mestic rubbish. Sump pits along the course of the

drains allowed solids to collect so that the flow ofvessels (storage jars) buried in the street in **vessels (storage jars) buried in the street in**

the technologically advanced urban drainage sys



A house in modern-day Sherwin, Sindh, with open vertical
A house in modern-day Sherwin, Sindh, with open vertical
drain emptying into the street drain, also open, in the true
A house in modern-day Harappa, with
fashion of Harappan period almost 6 millennia ago. Small
fashion of Harappan period almost 6 millennia ago. Small
drains from houses on either side of the street lead to the

street drain, also open, in the true fashmain drain, a la Mohenjo-daro
ion of Harappan period almost 6 millen

ion of Harappan period almost 6 millen
water was unimpeded; these were regularly cleaned
tems that the Indus Civilization constructed for sev

front of the house. These sump pits were

eral of their more important cities. Ruins from two
there were two brick cesspits, one of which had
cities in particular provided a detailed glimpse of the
cities in particular provided a detailed glimpse of the
Indus urban drainagesteps down into it to allow access for the cleaners.**The ruins from** systems.

4)There is evidence of septic tanks, whereby **4)There is evidence of septic tanks, whereby**

rated by about 350 miles, suggest that they were

the refuse empties into a storage jar buried in
the refuse empties into a storage jar buried in
the floor and the overflow connects with the
the floor and the overflow connects with the

the town sites. Connections were built from most

drainage flow.

to **open or covered channels con**
There is evidence that the Harappan used
structed in the center or the side of the streets. The

terracotta pipe to steer sewage from the roof to the
channels were either excavated into the ground or
channels were either excavated into the ground or

There is evidence that the Harappan used **There is evidence that the Harappan used**
terracotta pipe to steer sewage from the roof to

280
terns for potable uses. Deep wells injected urban
terns for potable uses. Deep wells injected urban
connected to the drainage channels, wastewater runoff into the underlying aquifer. The Persian

perwas not permitted to flow directly to the street sew

was not permitted to flow directly to the street sewspective of urban runoff was clearly as a vital natu



spective of urban runoff was clearly as a vital natu**ers. First, the wastewater was passed through ta**ral resource. Unfortunately, as time passed changes pered terra-cotta pipes into a small sump. Solids



ral resource. Unfortunately, as time passed changes

ment, the drains might come to be several meters overflowed and sewage ran into the streets before deep. Brick culverts on the outskirts of the city al Ancient Pakistan - An Archaeological History new drains were built and drain cleaning was relowed the drains to discharge outside the walls; Town Planning sumed.

shows that a rudimentary street planning and sew
terracotta pipe to steer sewage from the roof to the

age removal system was present is some Early
city drainage system. This was definitely an im
Harappan sites, such as Harappa, Kalibangan andstreets and many lanes ran a drain, 1 to 2 ft deep,
provement on what we frequently observe in most
Nousharo, and that the Harappan people followed acovered with bricks or stones, and provided with
of the small cities and towns of modern Pakistan
tradition which their predecessors evolved throughsumps and inspection traps at regular intervals. The
where the sewage just let fall down uncovered to
the preceding several centuries in Baluchistan andwaste water and other sewage of almost every
the open drain in the street. The illustration on the
Sindh. In view of these discoveries, it appears thathouse was channeled into the drain running along
next page should give the reader a flavor of the
the planned layout and sewage removal, foreshadthe street outside, sometime in the middle of the
drainage technology during the Harappan period
owed in the Early Harappan period at these locaroad and sometime along the side. Altogether, the
and a visual comparison with the modern one.

was extent of the drainage system and is remarkable, drains are generally paved with baked bricks or withsometimes these had a sluice or grille, to catch solshaped stone.ids or to prevent the use of these drains as illicit

entrances into the city.from the wastewater and collected into a series of
Sewage ran along a general depression in
bricks or stone, and covered with large bricks or
the street until finally, fifty to a hundred years later,
slabs of stone.The Mesopotamian Empire states of Assyria
the city once again took control and built new drains
and Babylonia marked great advances in civilization
directly above the old ones. These fluctuations in
vessels (storage jars) buried in the street in front ofduring the second millennium BC. The ruins from
street and drain maintenance resulted in the rapid
the Mesopotamian cities contain well-constructed storm cleaned from time to time.
build up of street levels. Many doorways and walls
drainage and sanitary sewer systems. For example, had to be raised above the level of the street to
the ancient cities of Ur and Babylon, located in pre
keep sewage from flowing into the house. Eventu
whereby the refuse empties into a storage jar buriedsent day Iraq, had effective drainage systems for
ally, entire rooms would be filled with dirt and a new
in the floor and the overflow connects with thestormwater control. The systems contained vaulted
house built well above the street level. Over hun
drainage flow. (Incidentally, modern Pakistani towns sewers and drains for household waste and
gutters are catching up with this technology. Unlike Hard
dreds of years this process of mound buildup raised and drains specifically for surface runoff. The mate
pans, however, no provision of cleaning these sep
the entire city high above the original plain level. rial of choice was baked brick with an asphalt seal

Drains were often reused from building period tic tanks is made)ant. Rainwater was also collected for household to building period at Mohenjodaro. This was done

by simply raising the walls with more bricks. At the southern end of the First Street in DK-G, the walls of a drain were repaired and raised at least twice. In its last construction phase this drain was 42 centimeters wide, but 2 meters deep in places. Most of the drains had brick or stone covers because they were under the street or ground surface. The most frequent cover was simply an ordinary baked brick laid flat across the sidewalls, although bricks laid on edge across the channel are also well documented. The wider drains were covered with large limestone blocks quarried from the nearby Rohri Hills. These blocks are especially common on the Mound of the Great Bath.

Besides the closed sewage installations for disposing of domestic effluent, open soak pits were also in common use, especially where small lanes opened onto bigger streets. They had to be cleaned of settled deposits from time to time. In places where the street drain was too far away from the house, closed sewage catchment vessels were used instead; they did not connect with any drainage network. These were positioned under the vertical toilet chute outside the house and had to be Harappan period.with

drainage system likeHarappan cities a character of their own.

Harappa is not present everywhere else, barring by the Harapans was the toilet. Toilets were built ofAt Mohenjo-daro, some of the street drains some segments which are clearly visible in the

baked bricks and possibly wood. More numerous were equipped with manholes that were used for

Harappan cities of Kutch and Saurashtra. Kalibanthan toilets, since only a few toilets have beenknown of

found thus far, were the bathing platforms. They
gan does not have drains running along the side of

their final discharge on the edge of the city. AS indithe streets. Instead, sewage was caught in large cated above, the house drains generally connected

to medium-sized open drains in the side streets. These open drains flowed into larger sewers in the main streets which were covered with bricks or dressed stone blocks. Corbelled arches allowed the larger drains to cut beneath streets or buildings until they finally exited under the city wall. Drains were found at all levels of the city. They seem, therefore, to have been made at the very beginning of the settlement and may have developed in the important Transitional Stage. Drains carrying rainwater were kept separate from those used for wastewater and sewage. The largest drains and culverts had corbelled roofs; a particularly impressive example is the drain running from the Great Bath at Mohenjodaro. Such drains are a feature of many Harappan settlements but not of all. Kalibangan, for example,

Jars for rubbish were a common feature of Harappan towns and cities: this example is from
had no drains; instead sunken soakage jars along
towns and cities: this example is from Dholavira. They
the streets were used. At Lothal there were both **formed part of a complex system of water supply**

and waste
drains and soakage jars.
disposal; while this system obviously had a practical value,
The street drains at most sites were generally **it may also reflect concern with ritual purity, a fundamental**
principle underlying later Indian religion, which may have is of stone. At Mohenjodaro there are some drains *Namit Arora***)**
ated with people in different ritual status groups, usable among themselves
where the bottom was made of gypsum and lime
tipped out regularly. In some cases they were fixed



Jars for rubbish were a common feature of Harappan towns and cities: this example is from Dholavira. They formed part of a complex system of water supply and waste disposal; while this system obviously had a practical value, it may also reflect concern with ritual purity, a fundamental principle underlying later Indian religion, which may have its roots in the Harappan period. (Namit Arora)

thought to be more pure. In traditional South Asia, materials such as metal that can be purified after use are more pure than those that cannot, such as unglazed terra-cotta. Different styles of particular objects may also be associated with people in different ritual status groups, usable among themselves but liable to be polluted if used by individuals of lower ritual status: For example, at Mohenjo-daro Dales and Kenoyer (1986) identified five different varieties of cooking vessel that might have been used by different status groups.

Allied to the social structure dictated by caste is a redistributive mechanism known as the *jajmani* system. In this system, all members of the community have reciprocal obligations to provide the products of their labors and certain services to others with whom they have a formalized relationship that to some extent resembles kinship. Payment for these goods and services is made in kind and fixed by tradition. The payments take place at regulated intervals and often in the context of religious festivals or other special occasions. Underlying the system is the notion of ritual purity: Some activities are pure, others not, and the caste hierarchy, based on degrees of ritual purity, is reflected in the division of labor. Ritually pure individuals require the services of impure individuals to perform tasks that would pollute them.

plaster with sides of baked brick. In most instances were built either as separate rooms or in the cor
eties of cooking vessel that might have been used by different status groups.
ordinary brick was used, but specially dressed brick
ners of multipurpose rooms. Most of the wells,was noted in some areas. For instance, specially
carried out of the city. This awkward arrangement
drains, toilets, and bathing platforms were private
have reciprocal obligations to provide the products of their labors and certain
shaped bricks were used to form the gently rounded
was most likely done for reason of the general gra
but there was also the provision of public facilities.
corners of drains. The integrity of the drains was
kind and fixed by tradition. The payments take place at regulated intervals dation of the city. Nevertheless, no matter what sort
Examples are found not only in the core areas ofachieved by closely fitting the bricks with a bit of
of drainage system was employed, the residential
its straight streetsIt must be mentioned here that an efficient the
that at Mohenjodarogive and Another new device invented

permanently into the wall so that their contents had to be scooped out. Yet other vessels had perforated bases and worked much the same as soak pits.

At Harappa many of the streets had large jars half sunk into the ground along them, into which rubbish could be thrown; more than two hundred have been found. Immediately to the north of the Lower Town in Mohenjo-daro was a dump for do



mestic rubbish. Sump pits along the course of the drains allowed solids to collect so that the flow of
ject in 1993, this large corbelled drain was built in the mid

water was unimpeded; these were regularly cleaned
out. In the main north-south street in Mohenjo-daro,
rainwater and sewage
there were two brick cesspits, one of which had steps down into it to allow access for the cleaners.
Civic standards were not always maintained; for
and irrigation uses. The Babylonians were partially
origins of the street planning and the sewage re
motivated to construct urban drainage systems by
moval system in the Indus Valley. Since there is no
their desire to remain clean. The Babylonians, like
indication of it anywhere in any other Bronze Age
the Hardpans before them, viewed uncleanliness as
civilization anywhere in the Old World prior to or
a taboo, not because of the physical uncleanness
contemporarily with the Harappan Civilization, the
but the moral evil it suggested (10).
logical conclusion has been that it was purely a
Harappan
Like street planning, the elaborate drainage

invention.
Recent
evidence,
however,

system is another unique feature of the Harappan Civilization. At Mohenjo-daro, below principal 281
305
the Harappan Civilization but also in Kutch and

Underlying the system i.i the notion of ritual purity: Some activities are pure, others not, and the caste hierarchy, based on degrees of ritual purity, ismud mortar. Dressed bricks made the fit even bethouses of almost all the excavated Indus cities were Saurashtra and they seem to be a part of the city ter. At Harappa a sequence of four drains, built one planning.
of impure individuals to perform tasks that would pollute them.
after the other, has been found exiting the city at the
To summarize, there are four types of public
main gateway. Some drains appear to have been
drainage systems in the Harappan cities so far ex
settlements there is some evidence of industry, bothprovided with wooden sluice gates or perhaps a grill in individual houses and in areas of more concen
cavated:to keep people or wild animals out from entering
1) The drain runs in the open in the middle
trated activity. At Harappa, there were industrial
or side of the street, just like that common in most
quarters on the west side of mound E, in its center,Wastewater was collected into small open

of the Pakistani villages and small towns. These and to the right of the southern gateway in mounddrains in the lanes and flowed into the main draindrains are generally paved with baked bricks or with

age system. Drains, usually of closely fitted baked
ET. In mound F, near the river, there were circular shaped stone.bricks, ran along the main streets, covered by large
working floors of baked bricks with central depresbaked bricks or stone slabs. At intervals there were sions that had once held wooden basins or mortars, inspection covers so that the free flow of the drains
each enclosed in a small building. Workshops are
known
from
many
parts
of
could be checked and maintained.Lower TownAgain, this type the at
Mohenjo-daro.
Concentrations
of
debris
of street drains are quite common in small cities and

from a
towns of Pakistan. As the street level rose, the sides
range of industries, found along the eastern and

of the drains were also raised with additional courses of bricks, so that, over the life of the settlesouthern periphery of the mound, reflect the existence of craft quarters; though the debris derives mainly from erosion and the dumping of rubbish, some industrial installations were located *in situ* in these areas. One of the most impressive workshops was the beadmaking factory at Chanhu-daro, which included a furnace. It is possible there were roofed open-air workshops around the periphery of mound II at Chanhu-daro. The majority of craft activities located in the towns and cities of the Mature Harappan period were light industry: making beads and faience and working in shell, stone, antler, bone, wood, metal, and steatite. Industries that created noxious fumes or other offensive by-products have seldom been located within the walled settlements; in most cases, the examples of such industries that have been found have either belonged to the period of urban decay or have been located in suburban areas, on the periphery of the residential area or in specialist industrial sites. For example, the malodorous activity of cleaning out shells took place on a separate suburban mound to the east of Mohenjodaro's Lower Town; copper smelting may also have been undertaken there. Whether these locations were a part of the city planning or a result of social pressure, is not known.

Caravansarais: Outside of the city wall at Harappa and only some 30 meters due south of the gateway is a small mound dating to the Mature Harappan phase, with houses, drains, bathing platforms and possibly a well. This cluster of houses may represent a temporary rest stop or *caravanserai* for travelers who were passing by the city or who had arrived after the city gates were closed. In the historical period, caravansarais were set up outside of major cities and along the major trade routes to accommodate traders and pastoral relays. Travelers could leave their goods in the rest stop while negotiating taxes or trading privileges. The evidence for such temporary habitations is available at other Indus sites also and given the widespread usage of caravansarais in early medieval period of the region, this explanation is quite plausible. Given the later trade practices in Afghanistan and Pakistan, it would not be surprising at all that every city of any respectable repute and size would have one or more caravansarais outside the city wall.

Suburbs: The citadel formed only a small part of most Harappan towns and cities, and the rest was taken up by the lower town, generally walled, and by unwalled suburbs. The existence of a suburban area has only recently begun to be apparent; very few have been investigated at all and none to a significant degree, and in the majority of cases even the extent of such suburbs is unknown. Consequently, many aspects of Harappan urbanism and society are still unexplored or poorly known. The picture, probably skewed, provided by the investigated lower towns is of well-appointed housing, light industry, and high standards of civic architecture, including excellent provision of water and sanitation.

Theevidenceforsuburbansettlementis growing, and it seems likely that this was a feature of many Harappan towns and cities. Extramural architecture has been uncovered at Mohenjo-daro, Harappa, Balakot, and Kalibangan; mounds and scatters of Harappan material, including bricks, suggest that suburbs may alsohave existed around other settlements, including Lothal and Dholavira. It is likely that suburbs often developed gradually as the area inside the walls became too small to accommodate all who wished to live in the town or city.

In some cases, areas of suburban development were later brought into the walled settlement by

constructing additional walls: for example, mound ET at Harappa, and the successive additions of the Middle Town and the Lower Town to the walled area at Dholavira. In other cases, including Sutkagendor, Surkotada, Gola Dhoro, and Kuntasi, among others, the suburban area was not walled; it probably housed those connected to but excluded from residence in the fortified area. The suburbs are also likely to have been the locus for heavy industry and craft activities with noxious by-products, such as brick making. They may also have included gardens, fields, orchards, or grazing, as has been the case in the suburbs of many cultures.

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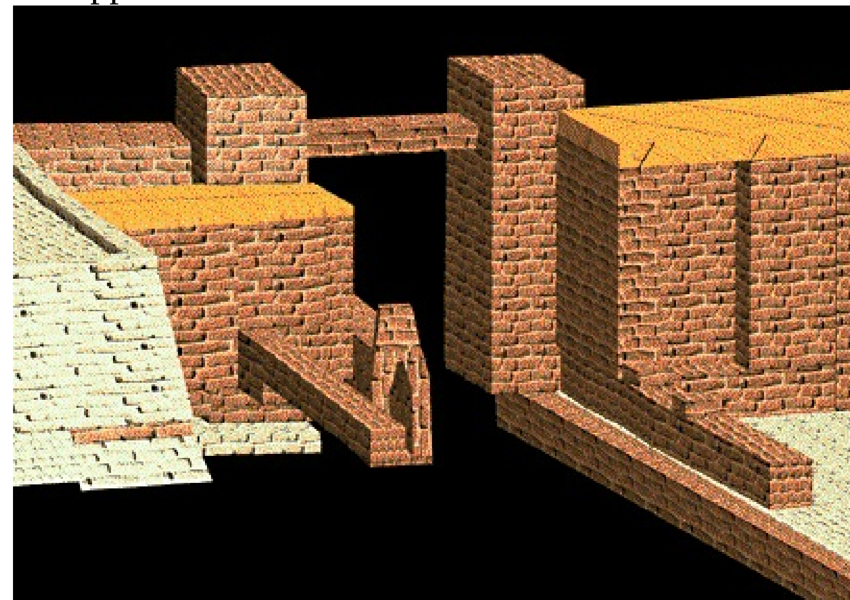
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Chapter 13

Harappan Architecture

Architecture
Chapter 10
Harappan Architecture


Artistic reconstruction of a city gate at Harappa

The architecture of theThe architecture of the Indus Civilization is an immense subject, far more than can be summarized
Indus Civilization is an
here. In fact, most of the
archaeological immense work subject, on the far Indus Civilization since the time of John Marshall

more than can be falls into this general category. Possehl and
summarized here. InKenoyer have summarized these details and fact, most of the ar

their summaries have been made use of here in the review of the subject. By necessity, thisw o r k discussion focuses on a restricted number of

done
on
the
Indus
themes that have some bearings on living Civilization sinceconditions of the Harappan people and on technology, raw material, house plans, private the
time of John Marshall falls into this general catebaths, house drainage, etc. which were gory. By necessity, this discussion focuses on a reinvolved. The public and monumental architecture, as scarce as it may have been in the

Harappan cities, has also been dealt with. There are massive water tanks, wide city stricted number of themes that have some bearings boulevards, narrow streets, and large warehouses. While this chapter addresses general on the living conditions of the Harappan people andaspects of the Indus architecture, there is much more said on this topic in the tour of on the technology, raw material, house plans, bathMohenjodaro in Chapter 6 and that of Harappa in Chapter 7. Some aspects of the Indus

architecture have been touched upon in connection with city planning in the previous ing facilities, house drainage, etc. The public and

chapter. Because of this overlap, a certain degree of repetition is inevitable.
monumental architecture, as scarce as it may have

The Harappan architect is recognized by the common use of bricks, sun-dried as well as been in the Harappan cities, has also been dealtkiln-baked, generally uniform style of houses with a courtyard, bathing platforms, with in these pages. There are massive water tanks stairways, lack of windows, and the like. It is remarkable that the essential features of

general layout of residential houses and their mode of construction has survived right
and large warehouses; these have also been dis

into the twenty-first century not only in Pakistan but also in parts of Afghanistan and the cussed.neighboring regions of India. The survival of these architectural elements almostWhile this chapter addresses gen
entirely intact for five millennia points not only to the conservative nature of the society

eral aspects of the Indus architecture, there is much

but also to a sound basis for house construction in the Harappan times. It is surprising more said on this topic in the tour of Mohenjodaro inthat very few archaeologists have paid any serious attention to this aspect of Harappan Chapter 7 and that of Harappa in Chapter 8. Somearchitecture. This most likely arose from their general lack of awareness of the current

village or small-city life in Pakistan.
aspects of the Indus architecture in Kutch and Sau

Building Materials rashtra have been touched upon in Chapter 9. Chapter 6 is a general discussion on the HarappanIndus cities exhibit a remarkable uniformity in both the raw materials used and the style
of construction employed. Because most Indus settlements were located in the alluvial

settlements and there a few general aspects of city

plains, the most common building materials were bricks, both sun-dried and baked; planning and architecture also came under discuswood; and reed. In the rocky foothill of Sind Kohistan and the scattered valleys of sion. Because of this wide ranging overlap, a cer

tain degree of repetition is therefore inevitable.

In the core area of the Harappan Civilization, the Harappan architecture is recognized by the common use of bricks, sun-dried as well as kilnbaked, generally uniform style of houses with a courtyard, bathing platforms, stairways, lack of roadside windows, and the like. It is remarkable that the essential features of general layout of residential houses and their mode of construction has survived right into the twenty-first century not only in Pakistan but also in parts of Afghanistan and the neighboring regions of India. The architecture in Kutch and Saurashtra, although generally conforming to the practices in the core area, differs somewhat. Here stone has been the material of choice for the construction of public facilities as well as for building of residential houses.

The survival of these architectural elements almost entirely intact for five millennia points not only to the conservative nature of the society but also to a sound basis for house construction in the Harappan times for the climate that generally prevailed. It is surprising that very few archaeologists have paid serious attention to this aspect of Harappan architecture. This most likely arose from their general lack of awareness of the current village or small-city life in Pakistan.

BUILDING MATERIALS

Indus cities exhibit a remarkable uniformity in both the raw materials used and the style of construction employed in the respective geographical areas. Because most Indus settlements were located in the alluvial plains and because most of the archaeological evidence comes from Sindh and Punjab, the most common building materials were bricks, both sun-dried and baked. Of course, wood and reed must have also been employed, of which little evidence is now available. In the rocky foothills of Sindh Kohistan and the scattered valleys of Baluchistan, Kutch and Saurashtra, where stone is commonly available, stone replaced bricks. Most often, rolled stones and boulders were used in the foundations if the rest of the building was to be constructed with sun-dried bricks. This is especially true with the structures in western Sindh and Baluchistan generally. The Harappans of Kutch and Saurashtra used stone much more extensively than anywhere else. Some of this stone was dressed.

Bricks: In spite of the widespread use of varied types of construction material, bricks, burnt as well as sun-dried, are definitely a characteristic of the Indus Civilization. Sun-dried bricks were used for both houses and town walls and their use was common. In Mohenjo-daro and Harappa, however, baked bricks were more extensively used for constructing houses and drains as well as for wells and bathroom floors. Bakes bricks were also used occasionally for other structures such as the working platforms in Harappa and the dyeing vats at Mohenjo-daro. Mud-brick was used at Mohenjodaro mainly for fillings, but at Harappa it often mated with burnt-brick, course by course. At Kalibangan mud-bricks seem to have been more common, burnt-brick being almost exclusively reserved for wells, drains and bathrooms.The use of bricks, whether baked or otherwise is rare, if at all, in Kutch and Saurashtra where stone was commonly used.

The use of sun-dried bricks, hand made from clay or mud, can be traced in the Greater Indus Valley to as early as the aceramic Neolithic period at Mehrgarh in Baluchistan, *ca*. 6000 BC (1). It was, however, not until the Kot Diji Phase of the Early Harappan Period (4th millennium BC) that the first mold-made bricks of standard proportions were made and used. The mud-brick walls were often raised on stone foundations in the Early Harappan period. This is evident from several archaeological remains, especially in southern Baluchistan. This tradition continued in the Mature Harappan Civilizabaked bricks in the construction of homes, monution in Baluchistan as well as in Sindh where many mental buildings, and drains. Notwithstanding the of the buildings were equipped with stone founda Architecture! common visualization of the Indus cities, Mohenjotions and the structures were built with sun-dried daro is the only Mature Harappan settlement where

bricks. The size of the bricks varied in this period baked bricks were used for most of the buildings. but it generally corresponded to a dimensional ratio
Baluchistan as well as in Kutch and Saurashtra where stone is commonly available,
At Harappa there is good evidence for the
of 1:2:3. This ratio continued in some peripheralstone replaced bricks. Most often, rolled stones and boulders were used in theuse of baked brick in the construction of houses but Architecture! foundations if the rest of the building was to be constructed with sun-dried bricks. This there is also a great deal of is especially true with the structures in western Sind and the eastern Baluchistan. The
mud and mud-brick construc
tion, and even evidence for

Harappans of Kutch and Saurashtra used stone much more extensively than anywhere baked and unbaked

bricks else. Some of this stone was dressed. used in the same building.

Baked brick at other loca**Bricks:** In spite of the widespread use of varied types of construction material, bricks, tions, such as Chanhu-daro, burnt as well as sun-dried, are definitely a characteristic of the Indus Civilization. Mud
Kot Diji, and Kalibangan, was
used mostly where its dura

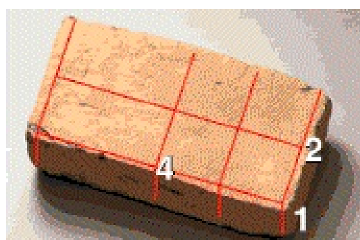
brick was used at Mohenjodaro mainly for fillings, but at Harappa it sometimes mated bility and other physical with burnt-brick, course by course, and at Kalibangan mud-bricks seem to have been properties suggested that it

more common, burnt-brick being almost exclusively reserved for wells, drains and should be used: for drains,



the lining of wells, and bathing platforms. There is no baked brick at Harappan sites in Kutch and Saurashtra, where the houses, walls, and drains were constructed of stone, nor was the material used at the Kulli sites. The same is true for Allahdino





near Karachi. The western

A field of brick kilns in modern Sind. The basic design seems to linger but the scale of operation **A field of brick kilns in modern Sindh. The basic design seems to linger but the scale of** most Indus site of Sutkagen

A typical Harappan brick, 1:2:4 ratio A modern replica of Harappan brick **operation changed** (Kenoyer) dor has no baked brick either.

bathrooms. As noted above, the use of

structures were built with sun-dried bricks. The size of the bricks varied in this period, it

sites, such as Kalibangan, even into the later times.

generally corresponded to a dimensional ratio of 1:2:3. This ratio continued in some

At brick, whether baked or otherwise, in

bricks

peripheral sites, such as Kalibangan, even into the later times.

were manufactured during its early, non

urban, phase. The smaller sized bricks, 7 x 12 x 34

At Harappa, two sizes of sun-dried mud bricks were manufactured during its early, non

cm, were used in houses, whereas the larger size,

urban, phase. The smaller sized bricks, 7 x 12 x 34 cm, were used in houses, whereas

10 x 20 x 40 cm, were used to make the larger pe

the larger size, 10 x 20 x 40 cm, were used to make the larger perimeter walls. While the rimeter walls. While the smaller size of brick is smaller size of brick is slightly irregular, the larger bricks have the standard thickness to slightly irregular, the larger bricks have the standard

Greater Indus Valley to as early as the

width to length ratio of 1:2:4.During the subsequent Harappan Phase (the Mature

aceramic Neolithic period at Mehrgarh,

thickness to width to length ratio of 1:2:4. During the Indus), the smaller mud bricks used to build house walls measured 7 x 14 x 28 cm but subsequent Harappan Phase (the Mature Indus or Baluchistan, c. 6000 BC (Volume I: the size of larger mud bricks used in building the city walls remained 10 x 20 x 40 cm. the Urban phase), the smaller mud bricks used to *Prelude to Civilization*Contrary to common conception, the use of mud-brick for construction of houses and

). It was, however,

build house walls measured 7 x 14 x 28 cm but the

other structures continued to be very common in Harappan period and lingered on right not until the

Kot Diji Phase of the Early

size of larger mud bricks used in building the city

walls remained 10 x 20 x 40 cm. Contrary to comIndus Period (fourth millennium BC) that

We see the first use of kiln-baked bricks at around 2,600 BC. There are millions of

mon conception of the Harappan structures built inthe first mold-made bricks of standard baked

bricks at Mohenjodaro, there must have been even more at Harappa before their baked bricks, the use of mud-brick for construction

use in the construction of the Lahore-Multan Railroad. Several other sites also display a

of houses and other structures continued to be very

liberal use of baked bricks in the construction of homes, monumental buildings, and on common throughout the Harappan period, even

drains.

lingered on stone foundations in the Early right into the modern times. Similarly, Indus
one still finds some old houses in Punjab, probably
The houses at Mohenjodaro are built with bricks of nearly uniform dimensions, 27.94 built a century or two ago, wherein the small bricks
archaeological remains, Page 286 especially in of Harappan proportion, now baked, have been tradition
used. southern Baluchistan. This
continued
in
the
We see the first use of kiln-baked bricks in
Mature Indus
the Indus Valley at around 2,600 BC. There are mil
Civilization in Baluchistan as well as in lions of baked bricks at Mohenjo-daro, there must
Sind where many of the buildings were

have been even more at Harappa before their use in the construction of the Lahore-Multan Railroad. equipped with stone foundations and the Several other sites also display a liberal use of


A brick factory in Punjab: still making bricks the

Brick manufacturing in Punjab: still making bricks the Harappan way

Harappan way

Baluchistan as well as in Kutch and Saurashtra where stone is commonly available,

stone replaced bricks. Most often, rolled stones and boulders were used in the Here, like Kutch and Saurashtra, stone is more foundations if the rest of the building was to be constructed with sun-dried bricks. This over time. Similar pattern had been observed at common. is especially true with the structures in western Sind and the eastern

Baluchistan. The **Mohenjo-daro by Dales.**

The uniformity of brick sizes in 1:2:4 ratio The techniques used in making bricks in the throughout the realm of the Indus Civilization has

Harappans of Kutch and Saurashtra used stone much more extensively than anywhere

Harappan times are unlikely to have been very dif

else. Some of this stone was dressed. been frequently commented on with a high degree

of amazement. Scholars originally thought this uni
ferent from those of today. Bricks would have been made in molds, probably of wood. The bricks were

Architecture

Bricks:formity represented a strong centralized govern In spite of the widespread use of varied types of construction material, bricks, made in an open mold and struck across the top

!
ment, but it is probably the result of concepts of
with a piece of wood, as proven by their striated

burnt as well as sun-dried, are definitely a characteristic of the Indus Civilization. Mud

measurement and proportion that were passed on upper surfaces. The bases of bricks are invariably from one generation of builders to the next and

brick was used at Mohenjodaro mainly for fillings, but at Harappa it sometimes mated

rough, showing that they were made and dried on

gradually spread to distant communities along withwith burnt-brick, course by course, and at Kalibangan mud-bricks seem to have been dusty gr.ound, which is borne out by the frequent

the specialized artisans. In all appearances, the
presence of potsherds and bits of charcoal adhering

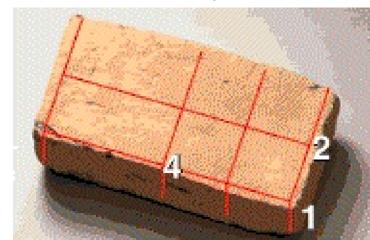
more common, burnt-brick being almost exclusively reserved for wells, drains and

to their bases. This method is still used to make



bricks all over Pakistan. After the bricks had set, the molds would be removed and the bricks left to dry. Mud bricks were now ready for use; those to be baked were stacked over a hearth, covered with fuel and fired. The stack would burn for days before the process was complete. Since the only surviving trace would be the hearth, brickyards are likely to

Architecture be hard to detect archaeologically. Architecture!



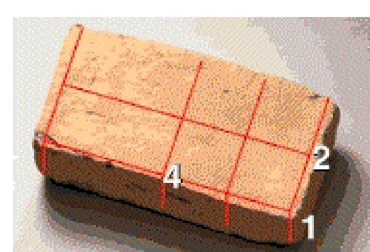
A modern replica of Harappan brick

brick, whether baked or otherwise, in


A typical Harappan brick wall
A typical Harappan brick wall A typical Harappan brick wall

Indus cities, Mohenjodaro is the only A typical Harappan brick, 1:2:4 ratio Mature Harappan settlement where baked A typical Harappan brick, 1:2:4 ratio is the only Mature Harappan settlement where baked of the bathrooms. As noted above, the use of buildings. At Harappa there is goodthe evidence for the use of baked brick in the

buildings. At Harappa there is good
Kutch and Saurashtra is rare, if at all.
construction of houses but there is also a
evidence for the use of baked brick in the great deal of mud and
mud-brick
construction of houses but there is also a



The use of sun-dried bricks, hand made
construction, and even evidence for baked mud-brick
from clay or mud, can be traced in the
construction, and even evidence for baked building. Baked brick at other locations,
aceramic Neolithic period at Mehrgarh,
Baluchistan, c. 6000 BC (Volume I: building. Baked brick at other locations,
***Prelude to Civilization* such as Chanhu-daro, Kalibangan, was used mostly where its**
Kot Diji, and
durability and other physical properties
not until the Kot Diji Phase of the Early
durability and other physical properties
Indus Period (fourth millennium BC) that drains, the lining of wells, and bathing
brick size does not seem to have been mandatedthe first mold-made bricks of
standard be used: for but appears to have been evolved over time. Thedrains, the lining of wells, and bathing at
proportions were made and used. The

fact that this size ratio had been in existence long

Harappan sites in Kutch
platforms. There is no baked brick and Gujarat,at mud-brick wallsbefore the rise of large cities indicates that brick often raised on
Harappan sites in Kutch **and Gujarat,masons had probably developed these size**
proporstone foundations in the Early tions in order to build structurally sound
walls withconstructed of stone, nor was the material

period. This is evident from several
strong corner joins. It is also possible that the ratio constructed of stone, nor was the material of 1:2:4 was defined by some unknown ritual, sinceespecially in Thesouthern this ratio is not limited to bricks alone, but is reBaluchistan. near This Karachi. used at the Kulli sites. The same is true

flected in the rooms of houses, in the overall plan of

for
continued
Allahdino
the
near
Mature
westernmost Indus site of Sutkagen-dor
Indus The

houses and in the construction of large public build

Civilization in Baluchistan as well as in westernmost Indus site of Sutkagen-dor

ings. Jansen (2) has pointed out that this ratio is

also reflected in the overall plan of the large walledSind where many of the buildings were 1:2:4 sector at Mohenjo-daro called the citadel mound.





A brick factory in Punjab: still making bricks the ratio throughout the realm of the Indus equipped with stone foundations and the The uniformity of brick sizes in 1:2:4 While the dimensional ratio remained more or Civilization ratio throughout the realm of the Indus said about absolute measurements. In the excavacommented on withbeena highdegree of

tions at Harappan gateway at the juncture of Mound

frequentlyPage 285 thought degree of
a
strong
thought

Harappan way less constant through the ages, the same cannot be 6,000 years later, a brick house wall in the
modern village of Harappa.
6,000 years later, a brick house wall in the modern village of Harappa.

amazement. Scholars originallya highE and Mound ET, Kenoyer and his associates idenrepresented on tified three phases of buildings that showed a gradamazement. Scholars originally
Indus ual decrease in the absolute size of baked bricks this centralized government, but it is probablyrepresented

6,000 years later, a brick house wall in the modern village of Harappa.

uniformity a strong the result of concepts of measurement and centralized government, but it is probably286
proportion that were passed from

in the result of concepts of measurement and one generation of builders to the next
proportion that were passed from
and
one
gradually spread to distant communities



such as Chanhu-daro, Kot Diji, and A typical Harappan brick wall Kalibangan,

was used mostly where its durability and other physical properties **Ancient Pakistan - An Archaeological History**

Clay was also made into terra-cotta drain pipes, triangular terra-cotta cakes, and overfired nodules. The cakes were used in some cases instead of bricks for paving in bathrooms or courtyards and were also employed as baffles to retain the heat in kilns and fireplaces. They have often been found in fire pits and pottery kilns. Subspherical nodules of overfired greenish clay were used in construction, usually as a foundation layer under brick floors but also in masonry; these provided insulation and drainage.

Mortar and Plaster: Various materials were used for wall plaster, including clay. Early-third millennium evidence from a failed bonfire firing of pottery at Mehrgarh shows that limestone cobbles were packed in beside the pottery and included in



the firing, converting them to quicklime, which was

6,000 years later, a brick house wall in the
then ground to powder on querns. It is probable that modern village of Harappa.


An example of a wall construction at Harappa

An example of a wall construction at Harappa with a

with a combination of mud bricks and baked

(after Kenoyer)

bricks (after Kenoyer)

suggested that it shouldBaked bricks were obviously a valued combe used: for

modity, and plundering them seems to be as old as

drains, the lining of wells, and bathing

their manufacture. A stack of bricks against the wall

platforms. There is no baked brick

at Mohenjo-daro provided eloquent proof of the collection of bricks from the lower levels to build the

Harappan sites in Kutch **and Gujarat,**

houses of later date.where the houses, walls, and drains were

ThebakedbricksatMohenjodaroand

constructed of stone, nor was the material

Harappa were so well made and fired that they

have retained their redness and hardness till today,used at the Kulli sites. The

same is true for

and they are largely free of cracks, chips and cavi

Allahdino near Karachi. The

ties. One can hardly imagine that the pyrotechnol

westernmost Indus site of Sutkagen-dor

ogy of the Harappans was so perfect and their con

has no baked brick either.

trol of product quality so effective as is evident from the fired bricks found in the constructed walls. It is more likely that a large number of bricks must have

The uniformity of brick sizes in 1:2:4

been discarded to get a small number of usable

ratio throughout the realm of the Indus

bricks. The discarded bricks inevitably found their

Civilization has beenuse in filling the pits in the process of raising thefrequently commented on with
house platforms which were undertaken quite frea high degree of
quently.amazement. Scholars originally thought
The bricks ofuniformityMohenjodaro and Harappa this strong have no straw or other binding material. They arerepresented a
always rectangular in shape with the exception ofcentralized government, but it is probably those that were used for special purposes, such as the result of concepts of measurement and the wedge-shaped bricks almost invariably emone ployed in the construction of wells. The standardproportion that were passed from generation of builders to the next andbrick sizes throughout the Indus Civilization is a remarkable phenomenon which points to a commongradually spread to distant communities

culture in the Harappan realm. The early literature

along with the specialized artisans. In all

on the Indus Civilization contains a small phrase,

appearances, the brick size does not seem

'bricks of the usual size', which captures the sense

of the excavators and their observations on theto have been mandated but appears to

common use of this commodity in the Indus architecture.

have been evolved over time. The fact that this size ratio had been in existence long

No brick-making sites have yet been found

associated with Indus cities, but they would probabefore the rise of large cities indicates that

bly have been located in the suburbs or beyond;

brick masons had probably developed

modern brick making takes place well away from

these size proportions in order to build

towns and cities, but within a reasonable distance

for transport. Brick making must have been a major structurally sound walls with strong corner joins. It is also possible that the ratio of

activity in Indus times, given the volume of bricks
was mixed with burned shell for use in plaster. Lime

1:2:4 was defined by some unknown ritual, since this ratio is not limited to bricks alone, was also mixed with sand and water to make morused in urban construction. It used to be suggested tar, though mud mortar was more common.that huge areas of forest had to be felled to bake

the great quantity of fired bricks used by the Harap
pans. However, more recent studies have shown
that the scrubby natural vegetation of the Indus re
gion would have provided perfectly adequate quan

tities of suitable fuel. Cow dung was probably also burned as fuel.

Besides the standard cuboid bricks, wedge shaped bricks were also made for building the nu merous wells These bricks are narrower on one side and slightly wider on the opposite end, forming a truncated wedge. In the construction of wells, the narrower wedge was placed towards the center, thus rendering the circular construction stand tre mendous pressure that the surrounding soil would exert on the wall. It is because of this ingenues method of construction that the Harappan wells have been able to stand intact for centuries after their formation.

Page 288 The mortar for bonding the bricks was, however, rare. When present, it was generally lime-andmud and mud-and-gypsum combination. It is remarkable that even without the benefit of mortar, parts of some walls still stand five meters high decades after having been excavated. There is ample evidence that plastering of walls with a mud plaster was common practice. Whether this was decorated in any way we do not know. Cattle dung mixed with mud was applied as daub to the wattle walls of village huts; dung and mud or mud alone were also used to cover floors. The technique of constructing of walls from mud-bricks which were then plastered with mud, oftentimes mixed with cow dung to supply the binding fibrous material, continued to be used in Pakistan throughout history and served the village architecture quite well. The use of the cowdung reinforced mud plaster is still quite common in the construction of walls and roofs throughout Pakistan.

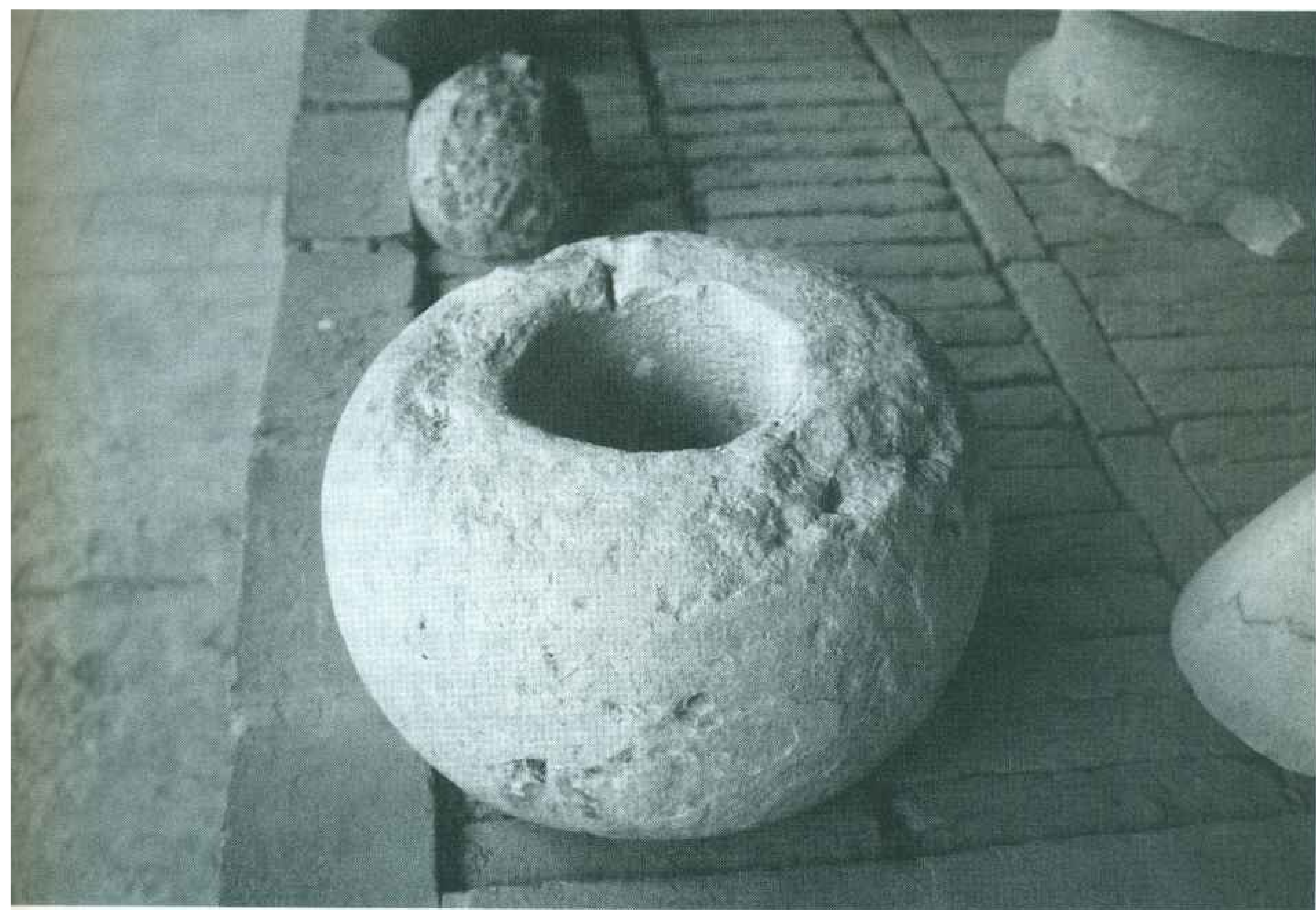
at

this practice continued in Harappan times. Lime
Harappan Civilization - The Material Culture

Stone: Of course, brick was not the sole architectural medium. The use of stone in the construction of foundations has already been mentioned. Where bricks could not be made with ease and the stone was available aplenty, such as in western Sindh, Baluchistan, and Gujarat, the superstructures were built with stone on the foundation of

**The use of stone as a construction material was not com**with ease and the stone was available
mon at Mohenjo-daro but occasionally stone slabs were
aplenty,
such
as
in
used for special purposes, such as this cover on the street
western Sind,

Baluchistan, **drain** and Gujarat, the superstructures were built with stone on the foundation of stones.Naturally occurring stone pieces were invariably used and the use of worked stone was quite rare. Limestone slabs are occasionally found at Mohenjodaro, covering brick drains; probably such blocks were quarried with the assistance of copper chisels and stone hammers, which had been specifically designed for this purpose.



An intriguing shape of sculptured stone is
the doughnut-shaped ringstone. A dump of **Limestone ringstones were used to hold wooden pillars in**
some special structures, including gateways into the citamassive ringstones was found in the lower
del at Dholavira and several pillared halls at Mohenjo
city at Mohenjodaro. Similarly sculptured
daro (HARP)
stones were found at Harappa as well as at
Dholavira. Mackay suggested that they



A polished sculptured stone with a narrow hole in the center from Dholavira. These objects were probably
served as a base for stone columns, the hole being used
for inserting a wooden stake for temporary support to

Architecture
the rising column in the process of its construction !



This large ringstone from Mohenjodaro is **This large ringstone from Mohenjo-daro is made of**
made of banded yellow and red-brown lime
banded yellow and red-brown lime- stone. Sourcing
stone. Sourcing studies of different varieties of
studies of different varieties of limestone conducted by Randall Law of the University of Wisconsin, Madison,
limestone conducted by Randall Law of the
suggest that this ringstone may have been brought to
University of Wisconsin, Madison, suggest that **Mohenjo-daro from quarries that have been located**
this ringstone may have been brought to Mo
near the site of Dholavira in Kutch.
henjo-daro from quarries that have been located near the site of Dholavira in Kutch.
were used as base for wooden columns. Small dowel holes are often found on side of these ringstones. It is possible that several of them were stacked with a wooden pole
running through the center.
Ancient Pakistan - An Archaeological History

stones. At Dholavira, the bunds around the reservoirs were faced with stone, which was extensively used in the citadel, and in the nearby cemetery where some grave pits were lined with stones. Naturally occurring stone pieces were invariably used and the use of worked stone was quite rare. Limestone slabs are occasionally found at Mohenjodaro, covering brick drains; probably such blocks

**Two of the many ringstones found at Harappa. These**

Two of the many ringstones found at

shaped and sculptured stones were probably used to

Harappa. These shaped and sculp

structures. Similarly fashioned stones have been

tured stones were probably used to

far as Lothal.

support wooden stakes in the construction of living structures. Simi

were quarried with the assistance of copper chisels

larly fashioned stones have been

and stone hammers, which had been specifically designed for this purpose. At Mohenjo-daro and

found at Mohenjodaro and other

other sites in Sindh, stone was occasionally used in

Harappan sites, as far as Lothal

houses, for example to floor a bathroom or as an elaborate version of wooden window grilles. Drain covers might be made of stone slabs.

The

An intriguing shape of sculptured stone is the

houses, though in
doughnut-shaped ringstone. A dumplines,of weremassive

ringstones was found in the lower city at Mohenjodaro. Similarly sculptured stones were found at Harappa as well as at Dholavira. Mackay (4) first suggested that they were used as base for wooden columns. Small dowel holes are often found on side of these ringstones. The purpose of these massive ringstones, however, remained a mystery until the 1990s when they were uncovered *in situ* in the citadel gateway at Dholavira. Those with a large central hole were the base for wooden pillars, as were reelshaped examples, while others, flattened spheres with a narrow central hole, were used to build stone columns, held together by a central wooden pole. Pillars of polished stone were also uncovered at Dholavira in and near the citadel. These monumental pillar bases and pillars may have had a religious significance as well as an architectural function.

Wood: Wood was also extensively used in architecture, though few traces have survived. Fragments of deodar, teak, and sissoo at Mohenjodaro, Kalibangan, and Lothal show that wood was used for roof beams and rafters, doors and their jambs, and pillars. Some of the largest public buildings at Mohenjo-daro and Harappa appear to have been made entirely of wood. Timber was used for the construction of flat roofs, and in some cases the sockets indicate square-cut beams of spans of as much as 4 m. In certain rare instances timber also seems to have been used for the construction of a semi-structural frame or lacing for brickwork. At Harappa evidence has been found recently for the use of pairs of square wooden posts standing in a row along a wall. Wooden beams and timbers were also used to construct a number of large buildings, such as the so-called granaries at Mohenjo-daro, Harappa, and Lothal. The complex in the southern part of the citadel at Mohenjo-daro included a large pillared hall and two smaller ones, all of which had originally had wooden pillars supporting their roofs.

Tropical hard woods and aromatic cedar were used for buildings and furniture. One locally available hard wood that became famous in trade with Mesopotamia is known as "shisham" *(Dalbergia sisoo)*. The dark hardwood is termite proof and is used extensively today in Pakistan for making doors, windows and furniture. A type of cedar, "deodar" *(Cedrus deodara)* was also used by the Indus artisans, but it is not native to the hot plains. Some cedar may have been intentionally floated down from the Himalayas by traders, but landslides and storms in the mountains would have tumbled many trees into the river naturally.

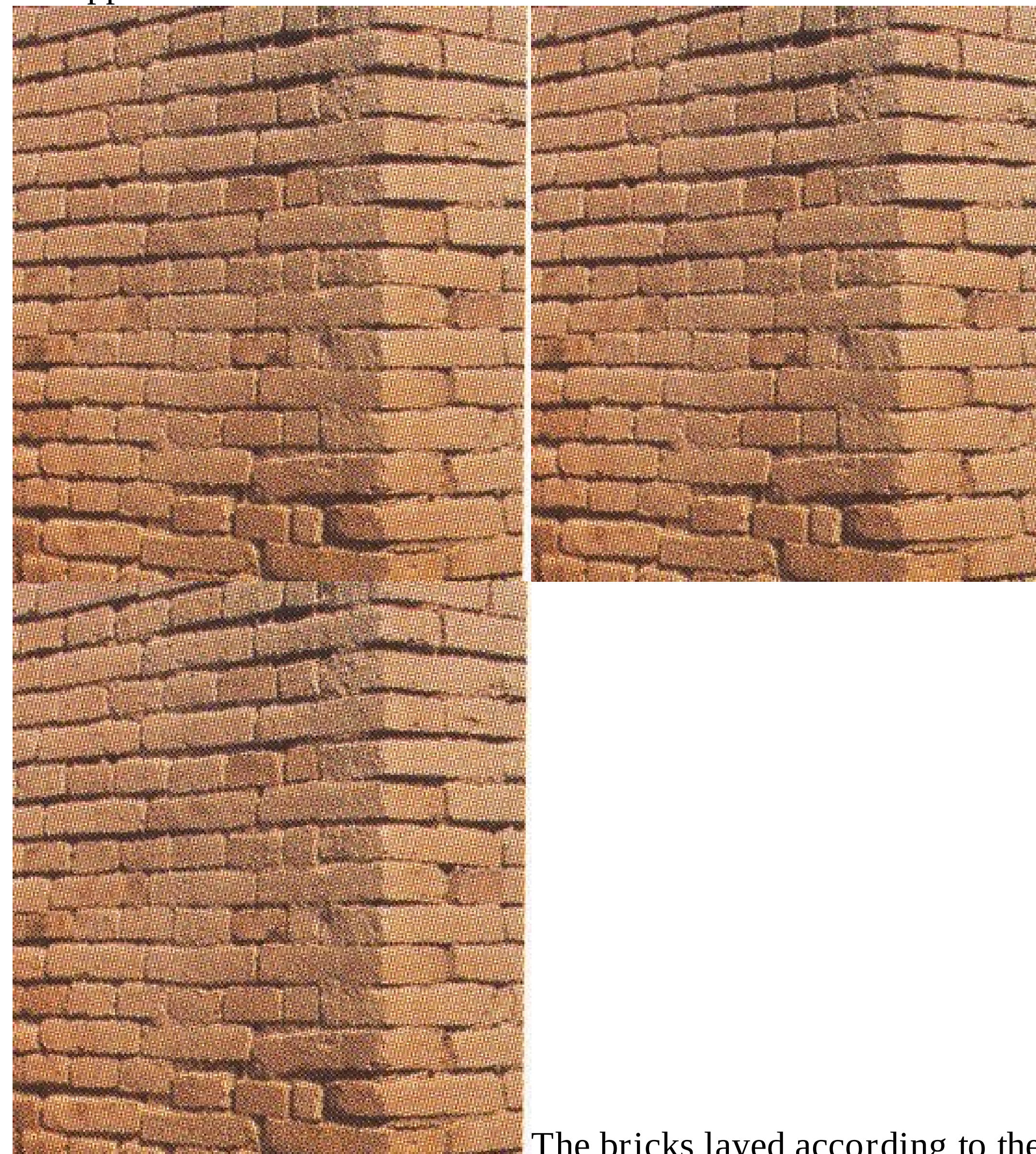
Brick-laying and Decoration: Baked or mud bricks were often laid in what is known as the English bond masonry, with alternating courses of headers and stretchers, an extremely strong construction method. Less commonly, Flemish bond masonry was employed, in which headers and stretchers alternate within each course. Masses of bricks were used, house walls at Mohenjo-daro being generally three to four bricks thick, while those at the smaller settlement of Banawali were two to four bricks. Frequently mud bricks and baked bricks were combined in wall construction, mud brick core enclosed in baked brick revetment.

The sophistication of Harappan construction techniques is visible in the Great Bath at Mohenjodaro. This had a baked brick outer shell and inner wall, with mud brick packing between them. A thick layer of bitumen was spread as a seal on the inside, and within this the bath was constructed of closely

Architecture
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Harappan Civilization - The Material Culture



The bricks layed according to the
‘English’ bonding technique, Mo The bricks layed according to the

The bricks layed according to the ‘English’ ‘English’ bonding technique, Mo**bonding technique at Mohenjo-daro**

henjodaro (after Ratnagar)

'Flemish bond' masonry at
'Flemish bond' masonry at Mohanjodaro (*after* Mohanjodaro (after Ratnagar))
Mohanjodaro (after Ratnagar)

Corners are always interlocking but
Corners are always interlocking but
Corners are always interlocking but there are
there are some examples of non
some examples of non- interlocking corner, such
interlocking corner, such as this
as this house at Mohenjodaro
house at Mohenjodaro
(after Ratnagar)
fitted bricks placed on edge, the gaps between them filled with gypsum plaster.

A type of surveying instrument was found at Lothal, Mohenjo-daro, and Bernoulli. The example from Lothal was a hollow shell cylinder with four slits on each of its two edges. This could be used to determine alignments and layout lines of buildings or streets at right angles. The one from Banawali was made from an animal vertebra and had two slits crossing at right angles.

Although the brick buildings of Indus towns and cities now seem austere, it is probable that in Harappan times a variety of decorations made them far more attractive. For example, at Dholavira in the phases preceding the earthquake, both the city wall and the walls and floors of houses were

covered with white and pink-red plaster. Walls may also have been decorated with textiles or other hangings. Some door frames had holes at the top from which curtains or matting may have been hung. The wooden structural elements and fixtures, such as door and window frames, may have been carved with designs that might invoke divine protection and ensure good fortune, as well as being decorative. House models show that some windows and internal partitions had intricately carved latticework grilles; a few examples made of alabaster and marble survive from Harappa and Mohenjo-daro.

The structures so far unearthed in the Harappan cities fall into four main classes: (i) Public Buildings (ii) Residential houses, (iii) Public and private bathing facilities, and (iv) Sanitary structures.

PUBLIC BUILDINGS

Neither Mohenjodaro nor any other Harappan site has structures that can be identified as temples. Nor is there any evidence that the Harappan people built palaces for their rulers or lavish tombs for their elite, as was the practice in Sumerian and Egyptian civilizations. The Indus people, nevertheless, engaged themselves in civil work and built other kinds of public structure. These included the massive platforms for constructing their residential and public buildings on them: public baths, water tanks, public halls, and the like. Some monumental buildings of this nature have already been discussed in Chapter 6, 7, 8, and 9: at the risk of repetition we shall briefly review a few of them afresh in order to set the Harappan public architecture in perspective.

Many of the largest and best-known buildings of the Harappan period are exemplified by those located on the citadel mound at Mohenjo-daro. Perched high above the surrounding plain, these important buildings would have been visible from all parts of the city to legitimizee the power and authority of the rulers. On the northern half of the mound are four large buildings that have been the focus of attention since their discovery in 1920s: the Great Bath, the Pillared Hall, the so-called Granary or warehouse, and the College of Priest. Other impor

into this large tank with high tide,

load or unload the goods and then leave it with the next tide. There is

tant public buildings have been found in different

neighborhoods of the lower mounds. In DKG areasome evidence that it received sea

is an expansive courtyard that may have been a

water on high tide, but if it was a

large market. At Harappa we observe some

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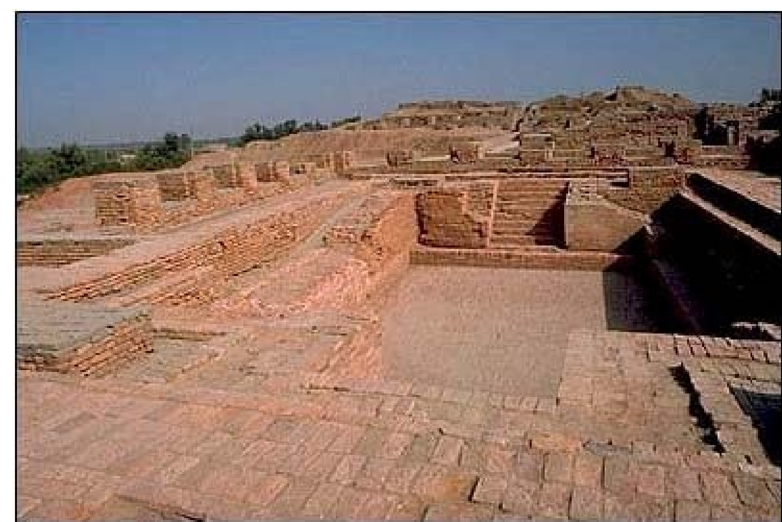
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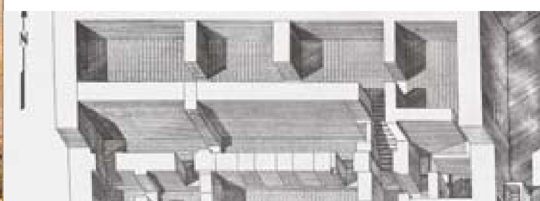
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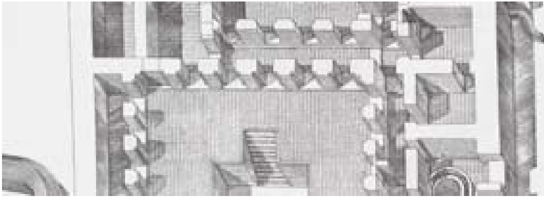


The Great Bath at Mohenjodaro

The Great Bath at Mohenjo-daro

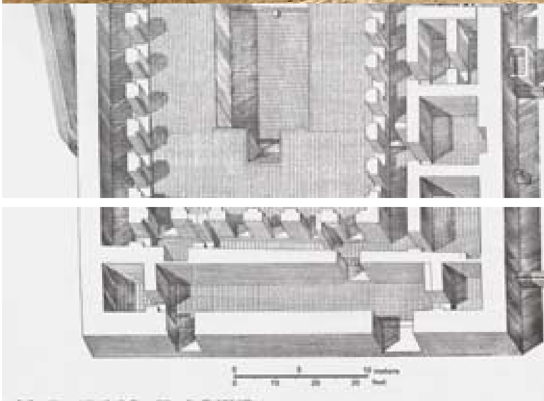








could have



A water tank at Dholavira

The water reservoir (the 'Dockyard') at Lothal A reconstruction of the Great Bath with it, especially since such a masonry structure was A reconstruction of the Great Bath ay Mohenjo hardly necessary for providing water for field daro
with it, especially since such a masonry structure was hardly necessary irrigation. Another suggestion is that the structure was a storage tank for rain water for the consumption of the city folk. This explanation also suffers from the indication that high tide would spill over the salty sea water into it and make the water useless for drinking and other household purposes. This is a perplexing structure but the missionary zeal of Rao and his adherents have precluded a serious enquiry as to its real function so far.
irrigation. Another suggestion is that the structure Page 293 was a storage tank for rain water for the consumption Water Tanks: The Great Bath, located at the of the city folk. This explanation also suffers from 'citadel' of Mohenjo-daro is without doubt the the indication that high tide would spill over the salty

earliest public water tank in the ancient world. The tank measures approximately 12 meters

sea water into it and make the water useless for long and 7 meters wide, with a maximum depth drinking and other household purposes. This is a of 2.4 meters. Two wide staircases lead down perplexing structure but the missionary zeal of Rao

into the tank, one from the north and one from the south. Small sockets at the edges of the

and his adherents have precluded a serious enquiry as stairs could have held wooden planks or treads.
to its real function so far. At the foot of the stairs is a small ledge with a



brick edging that extends the entire width of the pool. People coming down the stairs could move Page 293 along this ledge without actually stepping into the pool itself. The floor of the tank is water-tight due to finely fitted bricks laid on edge with gyp

An excavated water reservoir at Dholavira. Note the exquisite stonework employed for its construction.

sum plaster; the side walls were constructed in a similar manner. To make the tank even more

water-tight, a thick layer of bitumen (natural tar) was laid along the sides of the tank and presumably also beneath the floor. The floor slopes down to the southwest corner where a small outlet leads to a brick drain, which takes the water to the edge of the mound. This small drain first passes through a large rectangular space that was originally covered with wooden beams, and then through a corbelled arch drain that curves along the edge of the northern terrace of the 'granary'.

It is not clear as to what purpose this Great Bath was used. Public bathing could be one of the uses but it is unlikely that this elaborate building was used simply for public bathing, because just to the north is a substantial building containing eight small rooms with the more common bathing platforms. Most scholars agree that this tank was most likely used for special religious functions where water was used to purify and renew the well-being of the bathers.

A large water tank, closed on all four sides, has been excavated at Lothal. It is about 215 meters long and about 36 meters wide, with sides built of fired bricks. Rao, the excavator, has termed it a "dock",

suggesting that boats could enter into this



Close-up view of the pillared hall, which may have been a hall of assembly with paved walkways and places for people to sit in ordered rows
along each aisle between massive brick pillars. It was approximately 27.5 meters square (90 feet square) with twenty square brick pillars arranged

household purposes. This is a perplexing structure but the missionary zeal of Rao (5) and his adherents have precluded a serious enquiry as to its real function so far.

The inhabitants of Dholavira created sixteen or more reservoirs of varying size during Stage III. Some of these took advantage of the slope of the ground within the large settlement, a drop of 13 m from northeast to northwest. Some reservoirs were excavated, three into living rock. Recent work has revealed two additional large reservoirs, one to the east of the castle and one to its south, near the Annexe. The reservoirs at Dholavira were used for storing the fresh water brought by rains or to store the water diverted from a nearby rivulet. This obviously came in wake of the desert conditions of Kutch, where several years may pass without rainfall. These structures are cut through stones vertically. They are about 7 meters deep and 79 meters long. Bathing tank had steps descending inwards.

Granaries and Warehouses: Many early civilizations had large storage facilities in which tribute, taxes, or religious offerings were stored. Inves

large tank with high tide, load or unload the goods and then leave it with the next tide. There is some evidence that it received sea water on high tide, but if it was a 'dockyard', then it could have received only very small boats; the inlet into it had little depth. The alternative suggestion that it was an irrigation tank also has problems with it, especially since such a masonry structure was hardly necessary for providing water for field irrigation. Another suggestion is that the structure was a storage tank for rain water for the consumption of the city folk. This explanation also suffers from

the indication that high tide would spill over the salty sea water into it and make the water useless for drinking and other tigators looked for them in the remains of

the Harappan cities as well. A building was found at Mohenjo-daro which Wheeler designated a 'granary'. A close study of its features, however, showed that it was more probably a hall, because the brick podia that Wheeler thought had supported a raised granary floor are more likely to have been the bases of wooden columns. The idea of a granary, nevertheless, still persists as it has its parallel in Harappa and other sites, such as Lothal.
The Mohenjo-daro 'granary' lies on the Stupa Mound next to the Great Bath. It is 45 by 27 meters and consists of a series of 33 square brick blocks. It would have needed an elaborate wooden superstructure for which there is currently no archaeological evidence. The blocks were 1.5 m high with an

east/west dimensions of 4.5 meters and length between 6 and 9 meters. They were separated by 0.73 m wide brick paved passages. Along the north side, 2

meters below the passage paving was a 6 meter wide platform integral to the structure and running its entire length. Sir John Marshall suggested that this structure served as the ventilation space.

At Harapa, a large structure was located to the north of the citadel mound, near the river. Here a mud-brick plinth supported a series of twelve rooms or divisions, arranged in two rows of six, provided with sleeper beams to allow air to circulate beneath. Circular working platforms, some with the remains of charred wheat and barley husks, were found nearby. Wheeler used this as evidence to support the identification of these structure as a granary. The building is somewhat reminiscent of the earlier compartmented storerooms from Mehrgarh (see the figure on the next page). In the latter, there is actually evidence in the form of grain impressions and charred grain that these were indeed granaries. No grain remains have, however, been found in or around the structure at Harappa. Still, given the resemblance of floor plan of the Wheeler's granary at Harappa and quite a few proven granaries at Mehrgarh and other Baluch settlements, Wheeler's theory does not seem to be that farfetched.

At Lothal, the citadel contained a large structure which the excavator, Rao, believes to have been a warehouse. Constructed on a raised mud-brick podium, it contained sixty-four mud-brick blocks of which twelve have been excavated, arranged in three rows of four, separated by passes. Rao's claim is supported by the finds that came from the buildings, which included numerous seals and sealings from bales of goods that had been packed in reeds, woven cloth, and matting. So here at least there is evidence of a major storeroom, probably for 'manufactured goods' intended for trade' (5).

Similar structures have been found in other Harappan cities. For example, recent excavations in the settlement at Rakhigarhi claim to have exposed a granary with barley in one of its compartments - an extremely important discovery whose full publication is eagerly awaited for the past thirty years.The tiny settlement of Allahdino, which has been excavated in full, does not have a separate citadel, but its buildings seem geared in part to the administration of the surrounding area. The center of the settlement here is dominated by a courtyard around which the buildings were arranged. The north wing of the largest building contained a number of pottery storage vessels, and a separate smaller structure contained others. Was this building a public warehouse?

Since no grain, storage containers or clay sealings such as would have been attached to goods for

shipment were found in the "granaries" of Harappa or Mohenjo-daro, archaeologists today prefer to call these structures great halls, since they were clearly the largest known buildings discovered in the ancient Indus cities. In fact, the concept of granaries itself is presently being dismissed by some contemporary excavators. They point out to the fact that the identity of these structures was indeed never confirmed as granaries: Marshall speculated in 1926 the building at Mohenjo-daro as a ‘hot-air bath’. However, in 1950 Wheeler, through comparisons with similar structures in Crete and Rome, and not through any relevant finds within the premises, vividly described them as civic granaries. It is



A section of a room or bounded area within the so-called granary at

Brick platforms (capped) uncovered at Lothal, which Rao thinks were the base of a warehouse, probably with a light wooden struc



Eroded face of Granary at Mohenjo-daro. Built on top of a tapered brick platform, this building had a solid brick foundation that extended for 50 meters east west and 27 meters north south.

south.

obvious from this that definitions for granaries at Mohenjodaro and Harappa were partly based on comparisons with excavated structures elsewhere in the world, although Marshall and Wheeler's functional interpretations for a structural complex, seemingly non-domestic, non-religious and comparable to storage buildings from other civilizations, can be perceived as a logical extension of their enquiries into the urban-ness of the sites. Through their discoveries of a granary Marshall and Wheeler could substantiate their judgment thatArchitectureHarappa and Mohenjo-daro were urban cities, and could com

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comments on the presumed specimen from granaries: Marshall speculated in 1926 the building at Mohenjodaro as a 'hot-air bath'.
seemed to qualify as an obvious candidate for the Harappa. He believed that "when there was no curHowever, in 1950 Wheeler, through comparisons with similar structures in Crete and
public storage of grains. rency and taxes had to be paid in kind, the public Rome, and not through any relevant finds within the premises, vividly described them as treasury must have taken the form

of great store-houses which are known from other countries as well, such as the long and narrow storehouses attached to the Minoan Palaces at Cnossus and Phaestus in Crete".

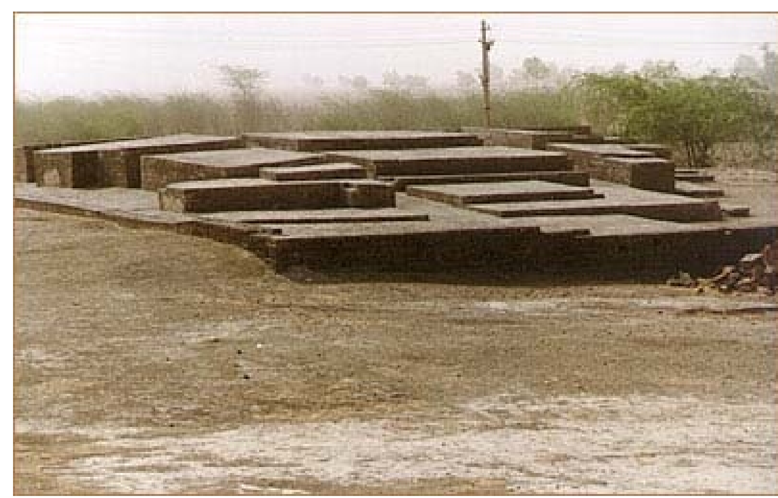
All three have been built on elevated ground. The Harappa building stood on foundations whose facing or retaining wall was at least and urban economies was an accepted 'fact' by the time Mohenjo-daro was excavated. By 1936, Childe (6) had eloquently argued through his 'urban revolution,' the necessity for a surplus in food production to sustain the 'priests, princes, scribes and officials, and an army of specialized craftsmen, professional soldiers, and miscellaneous laborers' in Egypt and Mesopotamia. The discovery of buildings which can be identified as granaries fitted neatly in this generalization of the time. That the granaries neatly dovetailed the functional needs of 'an evolved and disciplined civic life' is also well highlighted in Vats'



Compatmented buildings at Mehrgarh (Sixth millennium BC), generally be Compatmented buildings at Mehrgarh (Sixth millennium BC), generally believed to be grain storage rooms
lieved to be grain storage rooms

It is often assumed that the civic granaries. It is obvious from this that definitions for granaries at Mohenjodaro and 'granaries' at Harappa and Harappa were partly based on comparisons with excavated structures elsewhere in the world, although Marshall and Wheeler's functional interpretations for a structural Mohenjo-daro attest to the ex complex, seemingly non-domestic, non-religious and comparable to storage buildings traction of harvest taxes by the

Harappan state. Occasionally it has been said that the 'grana ries' are evidence for a redis tributive economy, although few scholars have tried to spell out just what would be involved in redistribution. Ratnagar (15) has discussed this issue by consider ing the functions of these 'grana



ries” at Harappa, Mohenjo-daro, The remains of a large building (capped), which

and Lothal. To Rao, the excavator, thinks was a warehouse, the probably a granary
function of the buildings, which

from other civilizations, can be perceived as a logical extension of their enquiries into the urban-ness of the sites. Through their discoveries of a granary Marshall and Wheeler could substantiate their judgment that Harappa and Mohenjodaro were urban cities, and could complement a situation where no other structure seemed to qualify as an obvious candidate for the public storage of grains.

The importance of food storage and redistribution for sustaining powerful ancient polities and urban economies was

have been declared “granaries”
is difficult in itself and there is no Page 296
consensus on their real function.
Were these three buildings used
for storage? If yes, then for stor
ing of what?

Theimportanceoffood
storage and redistribution for sus
taining powerful ancient polities



One of the several circular working platforms in the process of excavation at Harappa. These platforms were presumably used for pounding grain.

1 m stood earth and rubble platform about 4 m high, and the Mohenjo-daro structure was built on the high Citadel. The numerous granaries and stores built by the Romans also had elevated floors, except where these were relatively early in date and where the flooring was of stone or some other impermeable high. The Lothal platforms

on a mud-brick, rammed material. Closer in date to the Harappan structures are two building units at Ur. The earlier of these is a row of six long and narrow rooms in the Early Dynastic temple enclosure, termed 'shrines' by Woolley but identified as storerooms (15). Unlike the other rooms in the temple enclosure these six units had floors made up of fifteen courses of baked brick, the lower courses set in bitumen and the upper in clay mortar, so that each was approached from three steps from the courtyard. Deliberately elevated floors or foundations are therefore our first clue that the Harappan structures were storage facilities.

Problems, however, remain. For example, for all three of the Harappan structures we have wooden walls, although hundreds of dwelling units at these settlements had very thick brick walls. Roman granaries could have solid stone walls 60 cm to 1 m thick, and at Early Dynastic Ur the six storerooms mentioned above had brick walls about 2 m thick. While we would expect state storage structures to have been built on a standard plan, it is not impossible to imagine that the facility at Harappa, with its unique construction and very strong substructure, was a grain storage facility, while those at Mohenjo-daro and Lothal were used for storage of other goods like metal, shell, timber, or

craft goods. This would explain why the Harappa building is not located in the Citadel, but out near the river. And about 100 m to the south of this building lay two rows of perhaps 20 circular platforms, all of the same size, equidistant from one another except where an older well disturbed the alignment, but constructed in the same manner. These may have been public or state facilities used for husking, pounding and grinding grain.

No grain was found in the storage building at Harappa; the only antiquities found were three jars, a small seal, and a macehead. Similarly, in the Mohenjo-daro structure only charcoal, small pots, and a faience bead were found. Ratnagar suggests that the paucity of large storage pots in the three Harappan structures need not argue against storage functions. Large containers are also absent in the Roman horrea, in spite of the textual evidence that they were used not only for grain but also the storage of wine and Qil. Ratnagar (15) thus arrived at the conclusion that the three Harappan structures were storage facilities, but that only the building at Harappa can with confidence be interpreted as a grain storage facility. What does this tell us about taxation or redistribution?

Although the evidence of taxation by the state, receiving and storing of tribute, and redistributing it in times of need, is robust in Mesopotamia, such an evidence in the Harappan Civilization is missing. Ratnagar (15) has made the argument that the Harappan state mobilized the labor on a large scale and this in fact constituted the mobilization of surplus. In her opinion, the state mobilized labor to make large quantities of brick, to lay out new settlements, or develop quarries or shell fisheries. An infrastructural equipment of metal and stone tools and transportation seem to have been made available to the local communities. That is to say, the Harappan state seems to have mobilized labor in order to promote and regulate subsistence and craft production, and to have organized the distribution of tools and equipment or techniques for this purpose.

While we listed the difficulties in interpreting the structure at Mohenjo-daro as a grain storage centre, we still expect, at this pre-eminent center, the existence of a granary, a large structure, and not simply an adjunct to an elite residence, which stored the produce of state lands. Or else the state agricultural lands were widely dispersed and grain was disbursed or distributed at the threshing floors and was not centrally stored. A third possibility is that state service involved work for individual elite households within the largest city rather than for public institutions like a temple or palace. It is not impossible either that we have not yet found the Harappan granaries, that we are looking for the wrong kinds of structures or in the wrong locations. Considering what we know from the cuneiform texts about the Mesopotamian temple economy, here too the identified storage buildings are surprisingly few. But we know from the texts that the temple did not always have centralized storage (15).

To be precise, the data indicate that "granaries" have actually been identified only at Mohenjodaro and Harappa. At Lothal this issue was avoided by designating such a structure as a "warehouse", the claim for Rakhigarhi is still nebulous, and the nature of the small structure at Allahdino is only conjectural. As it turned out, other than interpreting them as granaries, these structures have little in common. Architecturally there is no similarity: at Mohenjo-daro the granary is a rectangular series of mud-brick platforms separated by narrow corridors, while the Harappa structure is two long blocks of subdivided rectangular units, separated by a central aisle. If uniformity in material culture was an important Harappan trait then it certainly is not reflected in the construction of these presumably important public architectural units.

There are no answers to the purpose of these structures; current speculation suggests that it may have been a palace for a ruler or a ruling group, or perhaps even a building for priests such as the later Buddhist monasteries, or simply meeting places for the citizenry. If these buildings were indeed storage facilities, we do not know precisely what function the goods stored in the warehouses played in the life of the inhabitants of the Indus cities. That these warehouses fit into an institutionalized state economy based on redistribution cannot be demonstrated. The fact that the warehouses at Mohenjodaro, Harappa, Allahdino, Rahkigarhi, and Lothal seem unique to these cities and individual in character, suggests that whatever the function of these buildings, it was confined to the particular city and may not apply to the civilization as a whole. That is, these warehouses served the local purpose. The inhabitants or the elite probably stored their own things for their own use as well as for patronage, or giveaways. These warehouses could also have been used as repositories of the offerings given to the priests or the mayors or the kings, if there were any.
owners. AS stated earlier, some houses are larger than others with more suites of rooms and larger courtyards. The size of the Harappan dwellings range from single-roomed tenements to houses with courtyards and upward of a dozen rooms of varying sizes, to great houses with several dozen rooms and several courtyards.

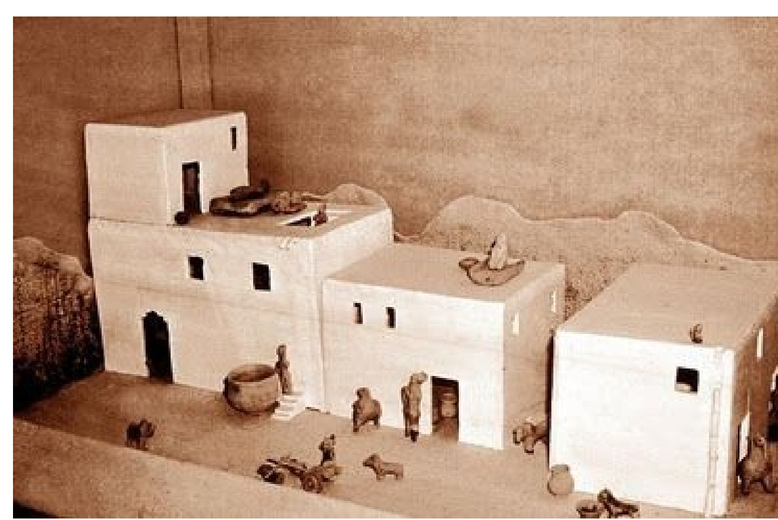
RESIDENTIAL HOUSES

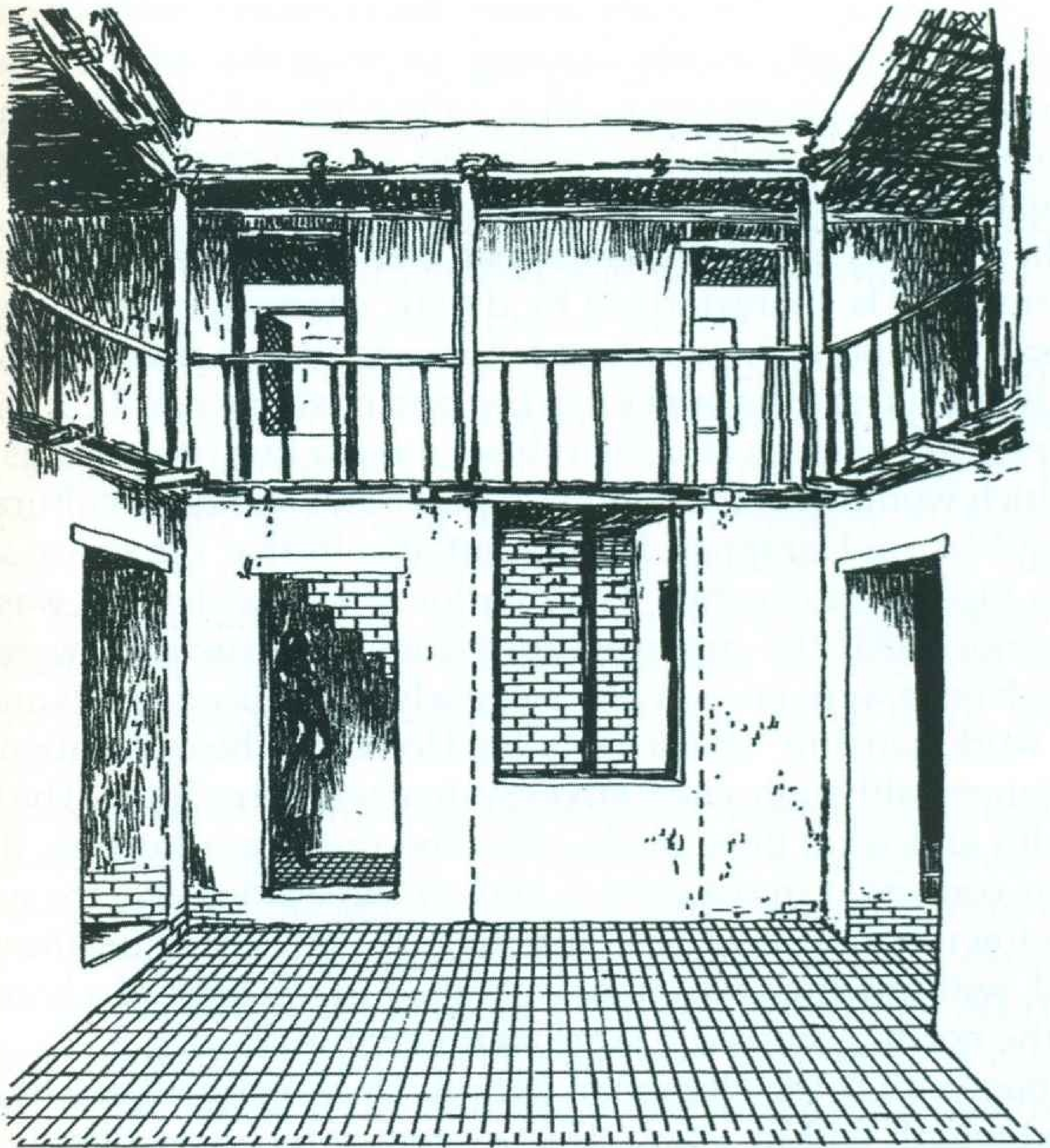
A house circumscribes the space within which a family dwells and works. It is, therefore, an important indicator of the social system under which the members of a society live and interact. The distribution of activities (as indicated by fireplaces, grinding stones, grain- and water-storage jars, and craft production facilities, etc.) may point to the arrangements for cooking, eating and working. Whether these activities occur in the more inaccessible (private) rooms, for example, or in more visible parts of the house, can be instructive.

There is much variation in the size of dwelling houses. The smallest have no more than two rooms, while the largest are so vast as to rank almost as palaces or the residential quarters of the whole extended family. The buildings were mostly plain, without any recession or plasters. Only in the floor of one house at Kalibangan ornamental bricks were used. The ground floor of a small house measured 8 x 9 m and of the large one was double its size. Although Harappan houses at Mohenjodaro survive as bare brick walls with traces of plaster, it is likely that originally they were extremely colorful, the plaster being decorated with painted designs. Doorsteps, which raised the householder above the level of the lane, may have been decorated, as they often are today with auspicious designs in red and white. The houses were separated from one another by about a foot, probably to avoid dispute with the neighbor, and the space in between was bricked up at either end to prevent the thief from scaling the walls. The walls were very thick which suggests that some of the houses were double storied. Square holes in the walls remind that the upper floors or the flat roof rested on wooden beams.

In major settlements, especially Mohenjodaro and Harappa, baked bricks were frequently employed for house construction, while in lesser settlements unfired mud bricks were more usual, and in some settlements, particularly in Gujarat, stone was mainly used. Over time, the house walls were repaired and rebuilt in the same place, whereas internal walls might be moved to change the layout of the domestic space. Occasionally, however, single houses were divided into two, or two houses were amalgamated into one.

The seeming uniformity of the Harappan residential quarters has already been commented on. However, when we look at the sizes of various excavated houses, this uniformity becomes rather elusive and the designs and sizes of the houses start indicating variations in the social status of the


A model of the Harappan houses, lined along a side-street

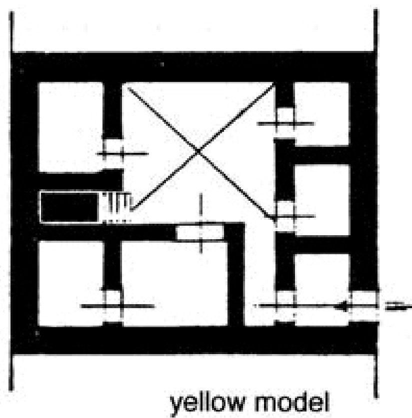


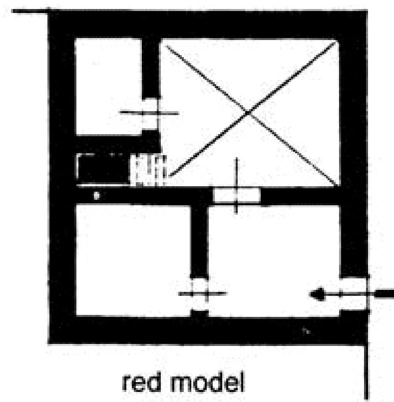
Artist's impression of the interior of a Harappan hpouse in the Mature period (*Fairservis 1971***)**

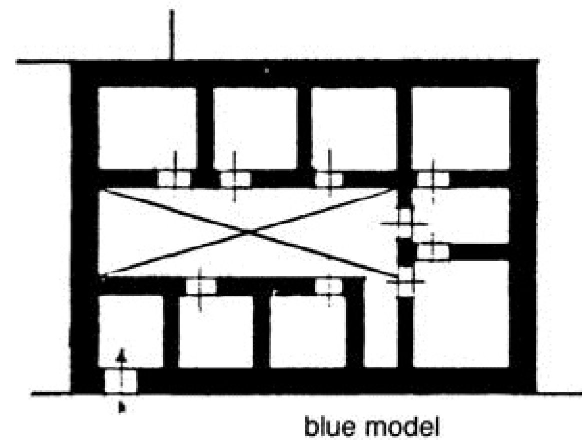
Judging from Mohenjo-daro, the courtyards are normally placed towards the northern sides of the houses. The entrances lie through antechambers or rooms accessible from the narrower side lanes. In some cases, they also open in the courtyards bordered by a street. In many cases brick stairways led up to what must have been upper stories or living flat roofs. Nearly all the larger houses had private wells. A recent study by Sarcina (3) shows that the great majority of the houses at Mohenjo-daro

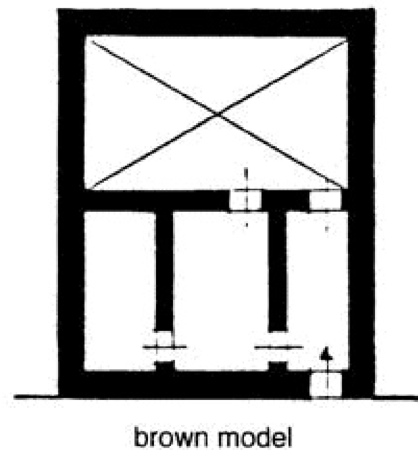
conform to one of five basic modules,

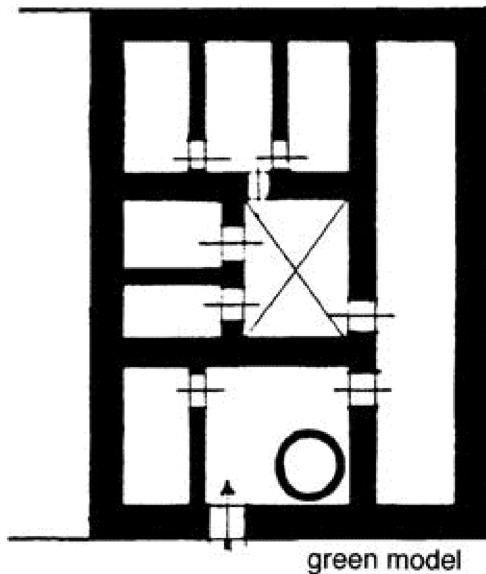
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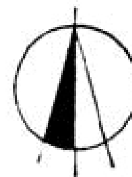

yellow model


red model


blue model


brown model


green model



Architecture!

depending mainly on the position of the courtyard.

These features of house construction remained alive until very recent times: the majority of traditional houses in Punjab and Sindh are built around a courtyard and most of them open on the side streets; the entrance is into a small room before one entered the courtyard; the houses of the poor generally open on the main street and entrance is directly into the courtyard. Most of the houses have permanent staircases which lead to the flat roof; the poor, however, use portable ladders to access the

roof. Several of these ‘Harappan’ style houses can still be found among old houses in small towns of Pakistan, eastern Afghanistan, and northern India to this day.

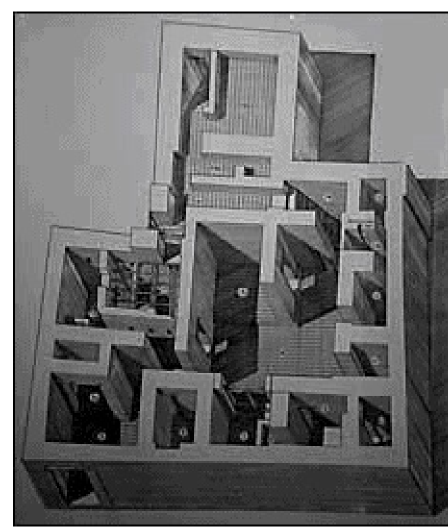
Housing Layout: The houses were generally built on plinths rising above the street level with flights of steps recessed in the wall at the front door. There was invariably a single entrance to the whole

bathing cells as well. Each sizeable house seems to have contained the families of the house, usually so placed that the inside of the master and of his servants, or accommodated sub-families of a joint family, sharing courtyard and the rooms opening into it could not be certain facilities like the well and a common cooking area in the courtyard. There was a seen from the outside. As stated above, the doors tendency in course of time to sub-divide the larger rooms into smaller ones with new of the houses usually opened on to the side lanes walls and doors. Craft-wastes found in several houses suggest that the artisans' quarters rather than on to the main streets, which might have could also be contained within these houses or that the craft activities were undertaken been considerably busy in the waking hours of the

in the living quarters.
crowded cities. A distinctive feature of the construc

tion was thus that the roadward side of a block preThe general plan of the residential houses suggests a square or a slightly oblong sented a plain blank facade broken only where courtyard open to the sky and surrounded by rooms and chambers. The entrance doordrainage chutes discharged. The houses seem of*Figure 4.20* Modular house-forms at Mohenjo-daronormally led to an antechamber with passages towards the kitchen, pantry, livingroomsten to have been built with an oblong perimeter wall.

Source: Sarcina 1979:437**Modular house forms at Mohenjo-daro**or the courtyard. The room besides the entry door has generally been identified byHouses at practically all Indus sites tend to
western archaeologists as a guard-post. This interpretation is, however, erroneous inhave the same general layout as at Mohenjo-daro. 371) maintains that a Harappan state properly so-called did indeed exist, thoughview of the living architectural tradition of the country, that mimics that of the Indus.On the average, one of every three houses had a
he nowhere defines what he understands a state to be, that is, what control/
ideological mechanisms have to exist for a society to be categorized as state
Traditionally, this room has well at Mohenjo-daro, usually near the entrance. always been used to receive,Close to the wells, many houses had bathing cells
entertain, and house the strangeras well. Craft-wastes found in several houses sugto the family. It also served as agest that the artisans' quarters could also be con
tained within these houses or that at least some
’bedroom’ for the sick. and the
ordered. Instead he just

A three-dimentional rendering of a house at Mohenjodaro **A three-dimensional rendering of a large house at Mohenjo-daro and probably other cities**
old.
craft activities were undertaken in the living quar

ters. In some cases a small room faced directly on Outer house walls at Mohenjoto the doorway. It has been assumed that it was daro were massive, 1.2 to 1.5 ‘janitor’ or guard room and that the visitor was first

confronted and checked out by a doorkeeper. This
meters wide (or three to four
bricks thick), sometimes shared is, however, contrary to the present-day practices of by adjacent houses. Walls of those who still occupy the Harappan-style houses in
even the smallest houses werethe countryside of Pakistan. In these houses, the

solid
brick, without rubble side room, mentioned above, is in fact used as a drawing room, to accommodate the stranger to the

filling. Walls were often raised for the visitors till thewith family or as a waiting room
one course of headerman of the house comes out of the house to wel bricks lying over a course of
come the visitor. It also served as a ’bedroom’ for
stretchers, as was the general
the sick and the old.
custom throughout the core area The courtyard was the center of the houseof the Indus Civilization. In hold, as it is in modern Pakistan and Afghanistan. such a system, which would Here much of the day-to-day business of life took have made not only for strengthplace for much of the year: preparing grain, fruit,but also quick construction,and vegetables for storage or immediate consumpbricks of 40 x 20 x 10 tion; washing and drying clothes; spinning, weaving,

centimeters make eminentand sewing; cooking, eating, playing, and sleeping. sense, for the course of headersIn some houses at Nausharo, part of the courtyard must be laid so that their centers lie over the joins between stretchers in the course was covered by a roof supported on posts or pillars. below. The architecture of a medium-sized town like Chanhu-daro is not greatly inferior The courtyard, which was usually paved with bricks to that of Mohenjodaro, although only mud bricks were used here.

297
As stated before, the foundations of the Harappan houses were strong, at some places made of stone and at other of bricks. During the later period, however, most of the

Page 300

laid flat, was surrounded by chambers, and doors and windows opened into it. The kitchen was placed in a sheltered corner of the courtyard, and the ground floor contained store rooms, well chambers, bath, etc.

Outer house walls at Mohenjo-daro were massive, 1.2 to 1.5 meters wide (or three to four bricks thick), sometimes shared by adjacent accommodated sub-families of a joint family, sharing certain facilities like the well and a common cooking area in the courtyard. There was a tendency in course of time to sub-divide the larger rooms into smaller ones with new walls and doors. This is a typical practice in some rural areas of Pakistan even today.

An interesting house of this type has been excavated in the Lower Town of



Mohenjo-daro. It is relatively large house which may deserve even to be called a notable's 'palace': it was nearly 300 square meters in area and ultimately contained some twenty rooms set around a courtyard. Another large house was apparently non-residential; two staircases opposite to each other led to the roof or the upper story, and a number of vessels of alabaster and Architecture!

objects of faience and ivory were
entraps hot air inside the room, there must be some openings through which this
found here along with fifteen seals,
entrapped air could escape. In historical times, it was achieved by providing a small
many depicting the mythical single
opening just below the ceiling of the room. This opening (in local parlance called

The existence of such houses,
rowshan-dan) also serves the purpose of letting the sunlight in.
although not many, makes us won
der whether the enclosed dwelling
It is not far-fetched to think that the Indus people universally used this type of top windows, the
had the same connotations and
rawshandans , to lighten up their houses and to let the warm air escape

Housing placement along Street 3Looking south along Street 3, which runs parallel to First Street in HR area.

without inviting moths and insects which



generally do not architectural feature

houses, but generally self-standing. Walls of even the smallest houses were solid brick, without rubble filling. Walls were often raised with one course of header bricks lying over a course of stretchers, as was the general custom throughout the core area of the Indus Civilization. In such a system, which would have made not only for strength but also quick construction, bricks of 40x20x10 centimeters make eminent sense, for the course of headers must be laid so that their centers lie over the joins

between stretchers in the course below. These fea tures seem to be common in every city and town in the urban phase of the Indus Civilization and the architecture of a medium-sized town like Chanhu daro is not greatly inferior to that of Mohenjo-daro,

Pakistan into the very recent past. The infrequent use of windows in the houses which the Hindus left behind in Punjab and Sind at the time of Partition seems to be a legacy of the Indus architecture.

The use of normal windows has, however, not been completely Harappan homes. These windows, when present, had shutters with latticework grilles above and below the shutters. This allowed air and light into the room when the shutters were closed and maintained

although only mud bricks were used here.
As stated before, the foundations
Harappan houses were strong, at some
of the
places

the privacy of the room from outsiders. The shutters and grillwork were probably

made of stone and at other of bricks. During the later period, however, most of the foundations of numerous fragmentary walls seem to have been laid on any kind of slipshod debris, possibly as a majority of them had nothing more than a thatched roof to support. Indeed, this is exemplified by the late dwellings in the extension of Period I and II in Mound AB at Harappa where a considerable quan tity of charcoal of pinewood rafters, bamboos and reeds was brought to light.

Each sizable house seems to have contained the families of the master and of his servants, or

made of wood, but some may have been made or reeds or matting. A few examples of carved alabaster and marble lattice work have been found at Mohenjodaro and Harappa. Set into the red-fired brick walls these lattices may have adorned the

House doors opening on the side sreet (upper levels of the houses of wealthy merchants or rulers.
The doors of later buildings can be seen in the These early artisans **wall to the left). The gradual tapering of the walls in the far**
upper levels of the wall to the left. The gradual
right was an intentional architectural feature to avoid col functional features of architecture with
tapering of the walls in the far right was an
lapse of the upper floors.
intentional architectural feature to avoid col

lapse of the upper floors.

patterned beauty, anticipated the elegant marble screens of the Mughal period and the more mundane

wooden screens in contemporary buildings.

importance of night life on the roof, as it has been the custom even into modern times. According to this opinion, the family slept on the roof (as they do even today all over Pakistan, when such a roof becomes
Indus homes also indicates that much of cooking was probably done on the roof, as has been the custom is parts of Pakistan into the recent times. As important as these functions are, the flat roof also provides a place for socialization, again as is being done even today in Pakistani villages and towns. Why the roof served so many functions? The answer largely lies in the climate of the region. The roof provides a nice

functions as the modern house with its notions of the family and its privacy and exclusivity. Did the large houses accommodate nuclear families or larger social units? All we know is that houses were not confined to the pur pose of dwelling alone: the debitage of



craftwork often mark the courtyard as an activity area of the house; and that, standing at the threshold, you could

not look into the entire house. We also know that such large houses continued in existence in traditional areas of Pun jab and upper Sindh into recent times and they housed only one extend fam ily rather than a non-kin social group.

In contrast to these structures and also the general style of houses, is a group of sixteen small, two room quarters at Mohenjo-daro built in two rows. Described in modern report as ‘coolie lines’, these had a counterpart



In some neighborhoods, large courtyards were connected to numerous smaller buildings built at different levels. The pilastered wall on the left supported houses at a higher level. A large corbelled arch drain that was

in Harappa as well. A corresponding A large house with two sturdy staircases, Mohenjodaro. This house had two stairscases like this structure of this kind is not found in later blocked is seen emerging from a wall in the background later historical times in Pakistan’s vilin order to facilitate orderly traffic. Some scholar think that this building could h have been a

lages
and
their

public building.(after Kenoyer)

emergence in the
Harappan culture is of much later origin.
More Than One Floor?: A number of masonry stairways have been excavated in Mohenjo

a sturdy staircase only reflects the

daro, leading to the roof from the courtyard. Their

presence has lead the archaeologist to assume that some houses, if not all, were a two-level affair and it has become almost an archaeological dogma that the average house in ancient Harappan cities stood at least two story high. This assumption have received added strength by the thickness of the en

closing walls. of hearth's remains in the

This author, however, believes that the Indus
houses were generally of single story: the existence of a sturdy staircase only reflects the importance of night life on the roof, as it has been the custom



Page 302

The original walls in a large building complex referred to as the Chief's house have been repaired and conserved. This
view shows some reconstructed ground floor rooms and steps leading to a second story room.



A close-up of the wide staircase

A close-up of the wide staircase leading to the upper

leading to the upper courtyard.

courtyard.

even into modern times. According to this opinion, the family slept on the roof (as they do even today all over Pakistan, when such a roof becomes available). The paucity of hearth's remains in the Indus homes also indicates that much of cooking

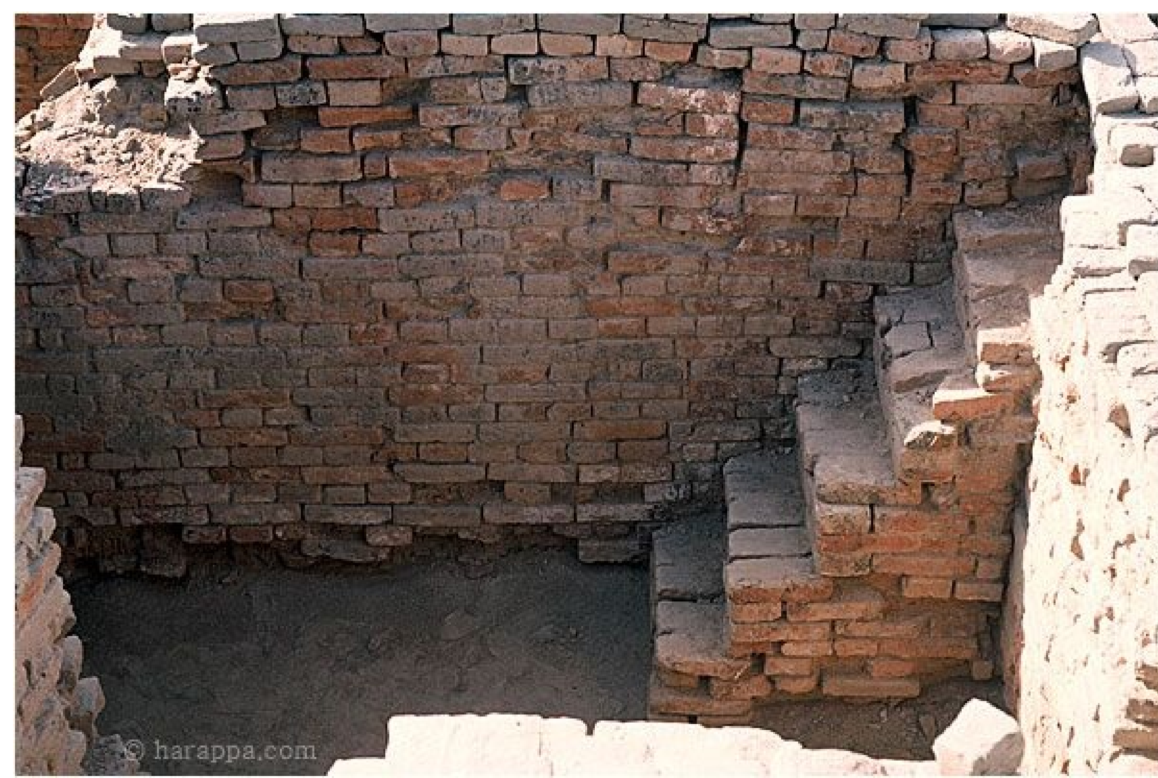
was probably done on the roof, as has been the custom in parts of Pakistan and Afghanistan into the recent times. As important as these functions are,

foundations of numerous fragmentary walls seem to have been laid on any kind of slipshod debris, possibly as a majority of them had nothing more than a thatched roof to support. Indeed, this is exemplified by the late dwellings in the extension of Period I and

II in Mound AB at Harappa where a considerable quantity of charcoal of pinewood bamboos and reeds was brought to light.

Another category of houses include large houses surrounded by smaller units. Complex passageways gave access to interior rooms, and numerous rebuilding phases indicate repeated reorganization of space. Outer units may have been the houses of relatives or service groups attached to the original house.An interesting house of this type has been excavated in the

Architecture !Lower Town of Mohenjodaro. It is relatively



large house which may deserve even to be called

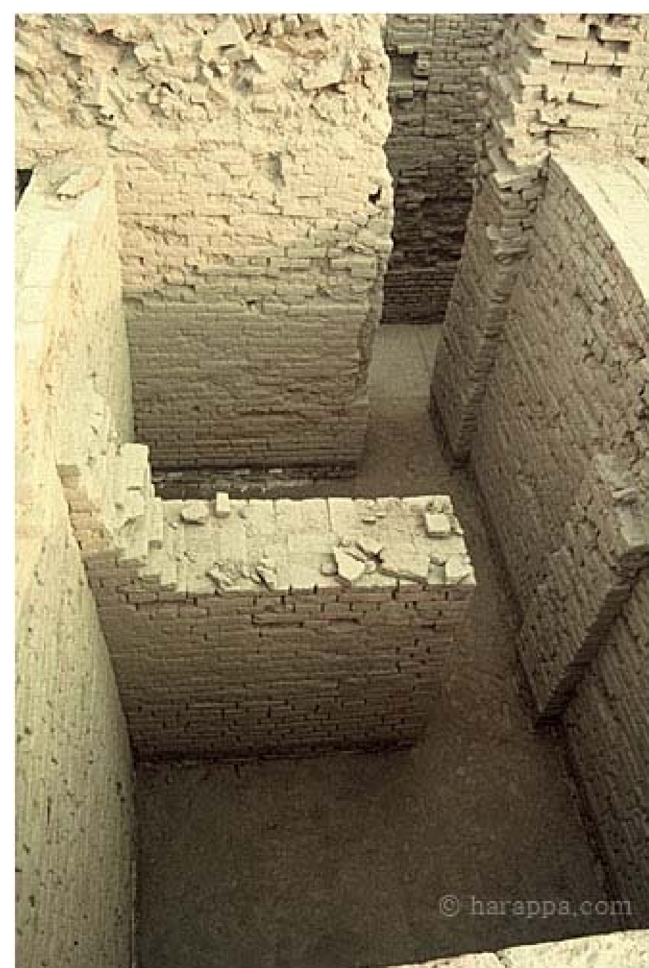
Some houses had small staircases leading to a second story

a notable's 'palace': it was nearly 300 square

or more liklely to the flat roof for evening household

meters in area and ultimately contained some twenty rooms set around a courtyard. Another large house was apparently non-residential; two

comparative staircases opposite to each other led to the roof or the upper storey, and a number of vessels of alabaster and objects of faience and ivory were rafters,



found here along with fifteen seals, many Looking down inside two rooms, in DKdepicting the mythical single-horned humpless G area, Mohenjodaro. This view shows bull, the ‘unicorn’.

area, Mohenjodaro. This view shows tapered
tapered walls that were built to support
walls that were built to support a second floor. a second floor. Later rooms were built
The existence of such houses, although not
Later rooms were built directly on top of these
directly on top of these walls because
walls because they provided a strong founda
they provided a strong foundation. The
many, makes us wonder whether the enclosed
tion. The wall of the building across the street
shows multiple phases of rebuilding

dwelling had the same connotations and wall of the building across the street functions as the modern house with its notions of shows multiple phases of rebuilding the family and its privacy and exclusivity. Did the large houses accommodate nuclear families or larger social units? All we know is that houses were not confined to the



purpose of dwelling alone: the debitage of craftwork often mark the courtyard as an

Another example of wide, permanent, and sturdy stairs to

Another example of wide, permanent, and sturdy activity area of the house; and that, standing at the threshold, you could not look into the **the roof or the second floor at Mohenjo-daro**

stairs to the roof or the second floor at Mohenjo entire house. We also know that such large houses continued in existence in traditional daroareas of Punjab and upper Sind into recent times and they housed only one extend

the flat roof also provides a place for socialization,

family rather than a non-kin social group.

again as is being done even today in Pakistani vil

lages and towns. Why the roof served so many In contrast to these structures and also the general style of houses, is a group of sixteen The only coherent discussion of roofs

functions? The answer largely lies in the climate ofsmall, two room quarters at Mohenjodaro built in two rows. Described in modern report the region. The roof provides a nice breeze in hot

summer nights. It also protects one from insects as 'coolie lines', these had a counterpart in Harappa as well. A corresponding structure

and mosquitoes, which preferentially hum at lower of this kind is not found in later historical times in Pakistan's villages and their elevations. In addition to these functions, the flatemergence in the Harappan culture is of much later origin.

roof is often used, and was probably used in the Harappan times, to spread cereal to dry and dates

to ripen. Page 301 In view of these comparative considerations, the presence of stairs in the Indus remains does not necessarily indicate a second or third story in the houses. The presence of a stairway in almost every house tends to negate notion of the second floor as it is improbable that every house had a second or third story. Given the amount of activities undertaken on the roof, even a small single story house would need a sturdy permanent stair to serve the family. The extensive use of the roof for varied pur

As houses were built on top of earlier structures, the windows and doorways were blocked up. Notice the changing alignments as the walls were remodeled

use of worked stone was quite rare.

Limestone slabs are occasionally found at

Mohenjodaro, covering brick drains; Ancient Pakistan - An Archaeological History

probably such blocks were quarried with

poses also explains the smallness of rooms in the

the assistance of copper chisels and stone

Harappan houses. Since most of the living was being done in the courtyard and on the roof, there was hammers, which had been specifically no need for large rooms in the house. This is in

designed for this purpose.

keeping with the modern practice in rural Pakistan

where the rooms are hardly used beyond storage of

An intriguing shape of sculptured stone is

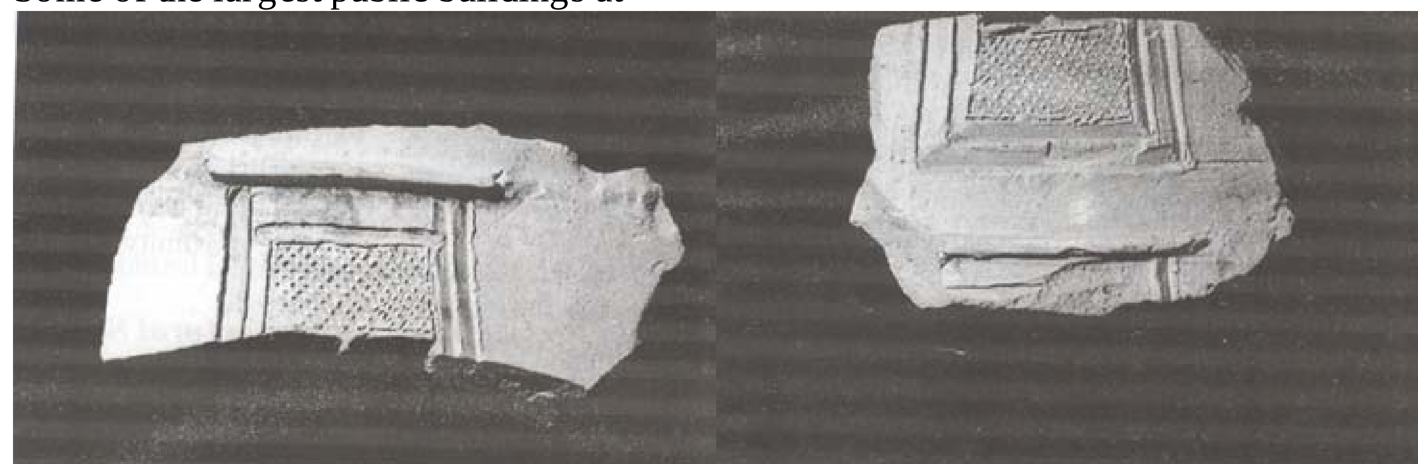
valuables and as a shelter during the occasional rain.

the doughnut-shaped ringstone. A dump of

massive ringstones was found in the lower
Roofs, Windows, Doors, and Other Fea tures:
city at Mohenjodaro. Similarly sculptured
The only coherent discussion of roofs on
Mature Harappan buildings deals with those from
stones were found at Harappa as well as at
Mohenjo-daro. Marshall opts for flat roofs set on
Dholavira. Mackay suggested that they

timber for all of his buildings at Mohenjo-daro, as were used as base for wooden columns. Small dowel holes are often found on side of
does Mackay. In walls that still stand at Mohenjocape without inviting moths and insects which gen

daro it is sometimes seen that ceiling beam sock
these ringstones. It is possible that several of them were stacked with a wooden pole
erally do not fly that high.
ets, aboutrunning through the center. centimetres square, were The use of normal windows has, however, not **Wood:**
been completely absent in the Harappan homes.
Some of the largest public buildings at



A large house with two sturdy staircases, Mohen
A terracotta model of a window from Mo
jodaro. This house had two stairscases like this in
henjodaro, showing woodwork

order to facilitate orderly traffic. Some scholar think this building could have been a public building.(*after Kenoye***r)**

These windows, when present, had shutters with Mohenjodaro and Harappa appear to have been latticework grilles above and below the shutters.
This allowed air and light into the room when the

made entirely of wood. Timber was used for
shutters were closed and maintained the privacy of

the construction of flat roofs, and in some cases the room from outsiders. The shutters and grillwork the sockets indicate square-cut beams of spanswere probably made of wood, but some may have of as much as 4 m. In certain rare instancesbeen made or reeds or matting. A few pieces of timber also seems to have been used for the carved alabaster and marble lattice work have been

construction of
found at Mohenjo-daro and Harappa. Set into the
a semi-structural frame or red-fired brick walls these lattices may have

lacing for brickwork. At Harappa evidence has adorned the houses of wealthy merchants or rulers. been found recently for the use of pairs of These early artisans combined the functional feasquare wooden posts standing in a row along a tures of architecture with patterned beauty, a tradi

wall.
tion that anticipated the elegant marble screens of the Mughal period and the more mundane wooden Tropical hard woods and aromatic cedar were screens in contemporary buildings. A house modelss how that some Harappan houses had windows
used for buildings and furniture. One locally with a lattice grille and shutters, probably of wood in available hard wood that became famous in most cases. One such rendering in terracotta is de trade with Mesopotamia is known as picted in the figure above.
"shisham" *(Dalbergia sisoo)*. The dark The doors were made with wooden frames, hardwood
is termite proof and is used and a brick socket set in the threshold served as a
door pivot. Clay models of houses show that some extensively today in Pakistan for making doors, of the doors frames were painted and possibly

windows and furniture. A type of cedar, carved with simple ornamentation. A hole at the "deodar" *(Cedrus deodara)* was also used bybase of the door may have been used to secure or lock the door and two holes at the top of the door Page 291 frame may have been used to hang a curtain. The lock at the base of the door and a curtain to cover the doorway is still a common practice in cities and villages throughout Pakistan, especially in Pothwar region and the Pashtun country.

Floors were usually of beaten earth, but some were paved with bricks or triangular terracotta cakes. Occasionally potsherds or tiles were used to cover a floor, and these might be decorated. At Lothal, floors were often paved with mud bricks. There is little evidence of furniture; some representations on seals suggest that low stools were sometimes used, but it is likely that, as in modern times, people mainly sat on mats and cushions on the floor. One model bed of the Early Harappan period has been found at Kalibangan, though the details of its construction are obscured by a bedcover; beds windows also entraps hot air inside the room, there must be some openings through which this entrapped air could escape. In historical times, it was

This large ringstone from Mohenjodaro is

achieved by providing a small opening just below made of banded yellow and red-brown lime
the ceiling of the room. This opening (in local parstone. Sourcing studies of different varieties of lance called *rowshan-dan)* also served the purpose

limestone conducted by Randall Law of the
of letting the sunlight in. There are still houses in

University of Wisconsin, Madison, suggest that
Punjab and Sindh that feature these below-theceiling
windows.
These
this ringstone may have been brought to Mo
rowshan-dans are also

henjo-daro from quarries that have been loquite common in southern and eastern Afghanistan. cated near the site of Dholavira in Kutch.It is not far-fetched to think that the Indus people universally used this type of top windows to lighten up their houses and to let the warm air es

three meters above the floor (which is approximately the modern minimum requirement) and spaced about a meter apart. Fragments of ceiling plaster, smoothed on one side, had reed-mat impressions on the other. Roof timbers were probably covered with planks, mats, beaten earth and thatch. All in all, the roofs must have been quite sturdy as the Indus people conceivably spent their nights on the roof.

Mackay(4)observesthatthetrickat Mohenjo-daro (and other Indus cities) was to keep the heat and dust out. Since windows work counter to this, windows are not found frequently in the Harappan houses. This is in consonance with the house construction of historical times where windows have been rare in rooms. Since the lack of may have resembled the modern *charpoy*, a wooden frame with a lattice of cordage.

Most of the residential houses had their own wells in the courtyards for drawing water, There also seem to have been public wells near open squares for the benefit of those whose houses lacked this amenity. The wells were all lined with brickwork and as protective revetments at their mouths to prevent children and domestic animals from falling into them.

Hearths, Kitchens, and Fireplaces: In some cases there was a small kitchen with a hearth, wher continued to be used in the Harappan times. They are in fact still used in the rural areas of Pakistan and probably parts of India. For larger cooking vessels, especially for warming or boiling of water, a supplementary post in the middle of the hearth was most likely used in order to give the earthen vessel an additional support. A few such *chulahs* resembling those of the Early Indus period but having the

Architecture !middle support post have been found at Kalibangan. The excavator, however, interpreted the central post as *linga* and depicted these hearths as 'fire

drains. Mackay has shown that some of these pipes represent vertical shutes, connecting
alters'. Again, you see what you want to see! the previes on the roof and the main sewage drain. e food could be cooked and water heated. Hearths A large number of are rarely reported at Mohenjo-daro, though theretriangular were a few on brick platforms. Marshall notes only
terracotta cakes have been found
three doubtful hearths at Mohenjodaro. Mackay (4)
around the residential baths,

informs us that these fireplaces were simple platlatrines, and drains in most of the
forms of brick, slightly raised, usually placed along

one side of a room. "In one house in HR Area there Harappan sites. In a discussion of the significance of these finds, was an arrangement for boiling water; the vessels
Wheeler once said: "Their great

were set on a high brick stand with an ample space abundance, especially in drains, beneath for fuel. This is in sharp contrast to the
shape and place of fireplaces of the Early Induswould be consistent with their use period in the same region: the latter resembledin the toilet, either as flesh rubbers more or less the contemporary *chulas* and they or as an equivalent to toilet paper.
were always found in the open place, outside the room.

Although humrous, this conclusion

is not farfetched: throughout the villages of Pakistan, people still use equally abrasive articles to wipe out the sticky stuff.


Sump pots, possibly latrine, Harappa

Communal hearths at Kalibangan or, according to some Indian archaeologists, a cluster of 'fire altars' The evidence for public or private latrines in Harappan architecture is murky at best. One instance is known at Mohenjodaro and a number of latrines cluster together were

InrecentexcavationsatHarappa,some
discovered at Harappa. The evidence at the site of Gola Dhoro neart Bagasra in Gujarat
rooms were found to contain the lower part of large is somewhat stronger where a number of latrines were found clustered together in a row.
The significance of these find is not yet clear.
pottery jars that had been used as portable hearths. Similar facilities may have existed at Mohenjo-daro.

Hearths, Kitchens, and House Fires **At Nausharo there was usually a brick-built**

fireplace



beside the eastern wall of the courtyard, with an
attached brick compartment containing a jar or clay
Very few hearths or kitchen facilities have been located in Harappan sites. Marshall
bin in which fuel was stored. Fire pits, with a central notes only three doubtful hearths at
Mohenjodaro. Mackay informs us that these

Kitchen area at Lothal. Note the stone construction

pillar made out of a brick coated in clay, are also fireplaces were simple platforms of brick, slightly raised, usually placed along one side
known. Though generally for domestic use, some
of a room. "In one house in HR Area there was an arrangement for boiling water; the
may also have been used for industrial purposes.
vessels were set on a high brick stand with an ample space beneath for fuel. This is in
The absence of fireplaces and hearths in Insharp contrast to the shape and place of fireplaces of the Early Indus period in the samedus towns has been an intriguing question for arregion: the latter resembled more or less the contemporary *chulas* and they were always chaeologists for long. This absence can be easily found in the open place, outside the room.
One of the most impressive rooms of theexplained in view of the Early Indus tradition where Harappan house wes the bathroom. Bathing wouldcooking was done in the open, a tradition still inThe absence of fireplaces and hearths in Indus towns has been an intriguing question forvogue in villages throughout Afghanistan, Pakistan, have followed the custom that is still used today, of archaeologists for long. This absence can be easily explained in view of the Early Induspouring water over oneself with a small pot. In a fewand part of India. If the hearths were located in the households, there may have been the refinement of

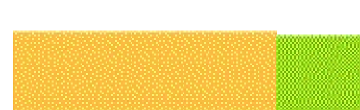
tradition where cooking was done in the open, a tradition still in vogue in villagesopen, i.e. in the courtyard, their absence in thea kind of shower: a small stair along one side of the
throughout Afghanistan, Pakistan, and part of India. If the hearths were located in the
structural elements should not be surprising. Anbathroom allowing another person to ascend and other explanation is that much of Harappan cooking
open, i.e. in the courtyard, their absence in the structural elements should not be
pour water over the bather. These bathrooms (or,
wes probably done on the roof.
surprising. Another explanation is that much of Harappan cooking was probably done
on the roof. indoor ‘bathing platforms’) seem to be standardSome excavated hearths in Mohenjo-daro, domestic convenience at Mohenjodaro. It was aKalibangan, and some other Harappan sites consistsmall area of not more than 2 square meters which
As far as the shape and construction of the excavated hearths in Mohenjodaro,
of three-posts arranged in semi-circle. The cooking was surrounded by a low brick rim to form a shallow

pot is placed on these three posts and the space Kalibangan, and some other Harappan sites are concerned, it appears that the three-posts below is used to ignite fire. These hearths were common in the Early Indus times and apparently

basin. The bricks of the floor were very carefully
prepared, sawn and ground to shape, with right angles where faces met and smoothed upper surArchitecture! area through a drain in the wall into a soak pit or straight into the street drain.

faces. This was specialized, careful work, expensive in terms of time, but then the jobs were relatively small in scale. The bricks varied in size, even within a single platform. The surfaces of these bath

ing platforms were slightly tilted so that water would run to a corner and out of the bathing area through



a drain in the wall into a soak pit or straight into the

street drain.

Plumbing in Mohenjo-Daro

From the time people began living in cities, they have faced the



Architecture

problem of plumbing: how to obtain clean water and remove human

!wastes? In most ancient cities, people retrieved water from a river or a Not only were Th.e floors of these platforms sloped



them out of town. Only the rich had separate bathrooms in their homes.

and tight-fitted,

central well. They dumped wastes into open drainage ditches or carted theyBy contrast, the Indus peoples built extensive and modern-looking



were

The ancient Romans also built

sophisticated plumbing and very smooth, sewage systems. Aqueducts

probably ground down after all of the bricks had

convenience until the 19th and 20th centuries. The toilets were neatly • In the 17th century, engineers

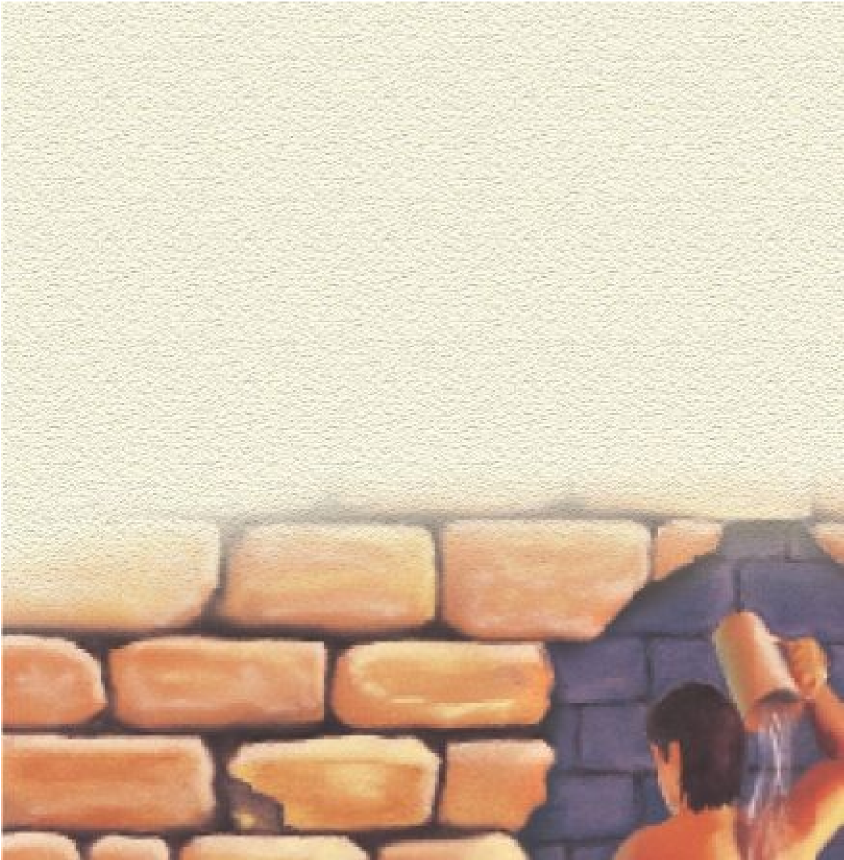
been fitted to give a seamless surface. Then they

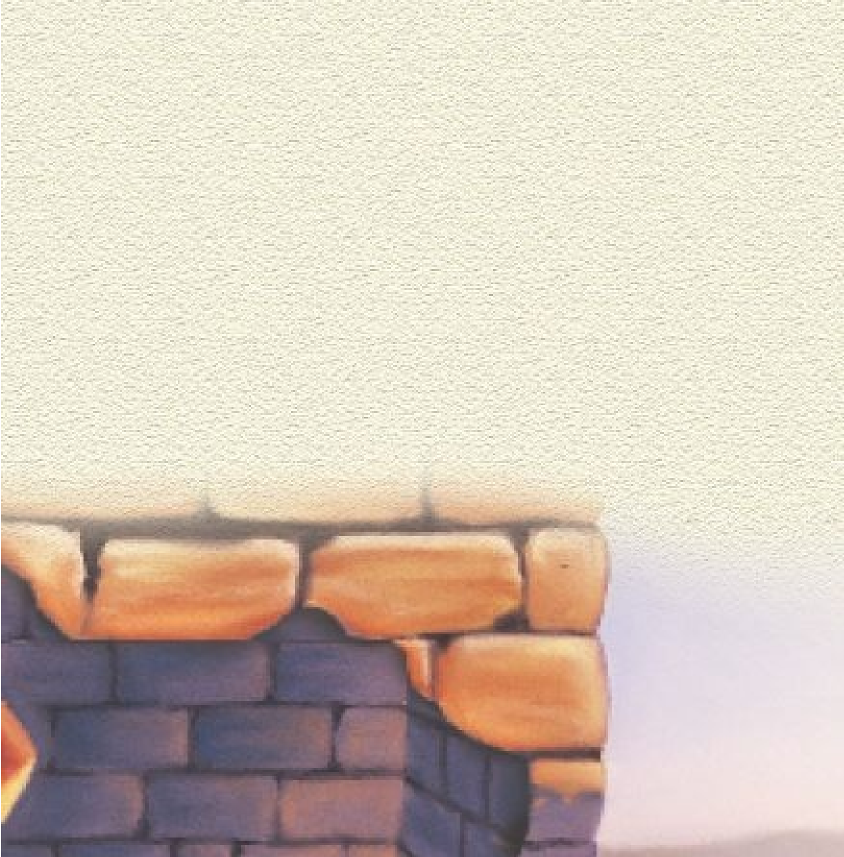
carried wastewater into an underground sewer system. fountains of Versailles, the

INTEGRATED TECHNOLOGY

RESEARCH LINKS For more on water and waste management

go to classzone.com





were coated with a

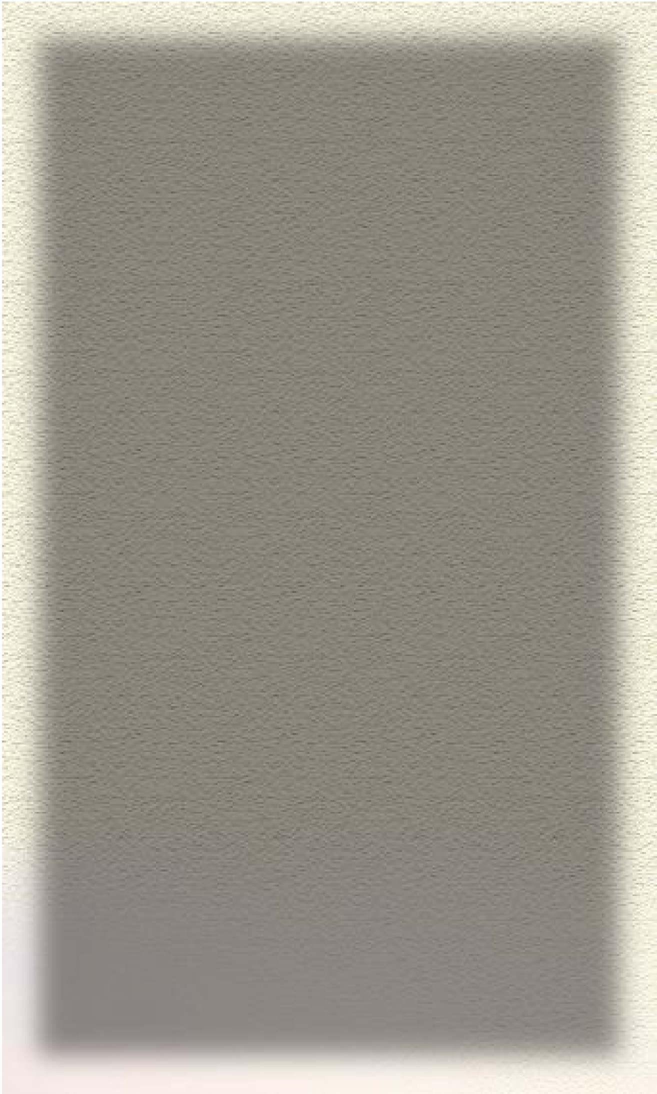
river three miles away. This

plaster of lime and

rather than gravity.

- The flush toilet was patented in

1775 by Alexander Cumming, a brick dust that was polished by the



plasterer and the



[1] In their private baths, people

feet

took showers by pouring

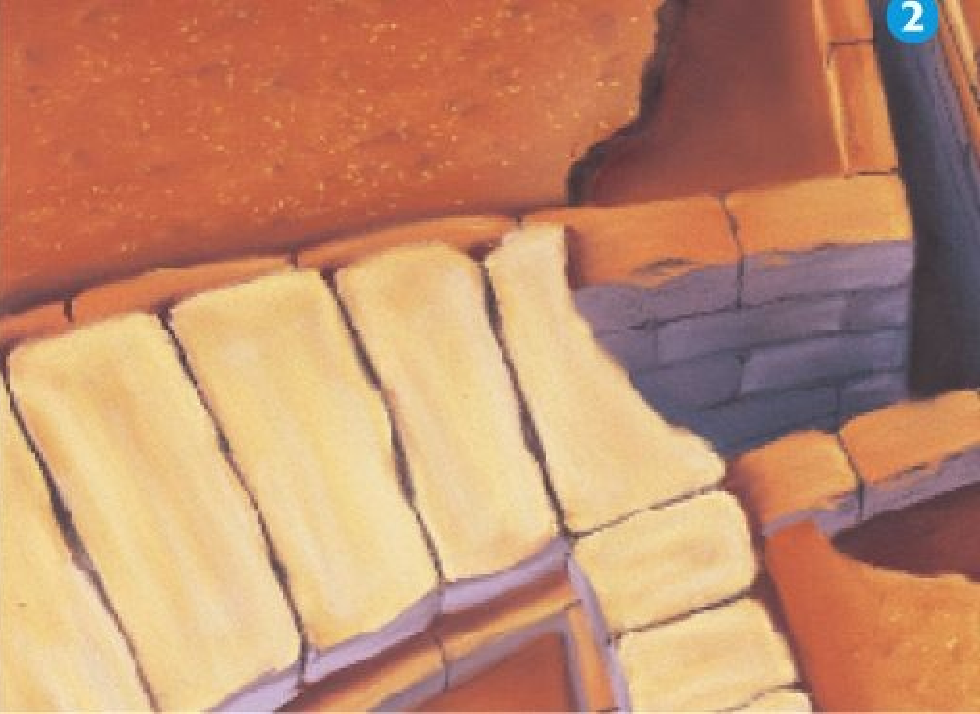
pitchers of water over the users. their head. of [2] This type of bath

ing facilities is still
common all over
Pakistan, espe

cially



1. Making Inferences What does the in villages





attention the Indus people gave to the plumbing and sewer systems suggest about their culture? and small towns of

See Skillbuilder Handbook, Page R10.

2. Comparing and Contrasting Punjab, Sindh,

out how water is supplied and wastewater disposed of in your home or community. How does the Baluchistan, and system in your home or community compare with what was used

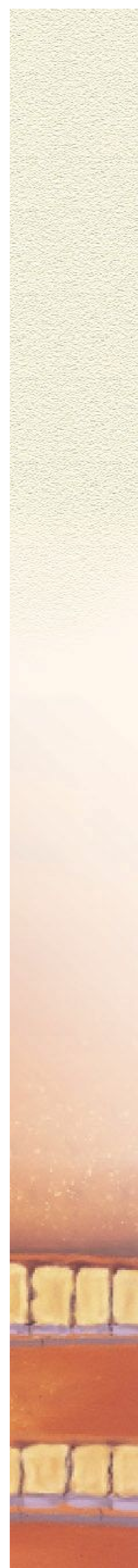
in some parts of the



Mohenjo-Daro?



[47]A row of bathing platforms and a large well may have been used Pashtun



country.**The sketch of a typical bathroom**

for public washing and bathing (the drains have been added for Similar bathrooms **(1) at Mohenjodaro and**

preservation) are occasionally **Harappa, with an outlet of spent**

arranged that they could provide an easy means for a servant, or member of the family, to pour water on the bather, thus making these more like shower rooms rather than o r dinary

Not only were the floors of these platforms sloped, they ground down after all of the bricks had been fitted to give a seamless surface. Then they were coated with a plaster of lime and brick dust that was polished by the plasterer and the feet of the users. This type of bathing facilities is still common all over Pakistan, especially in

Architecture **!**villages and small towns of Punjab, Sind, Baluchistan, and some parts of the NWFP. Similar bathrooms are occasionally found in East Afghanistan as well. It appears if nothing has changed in their construction over the past five thousand years, the same construction, the same dimensions, the same location in the house.

Bathing facilities



A typical bathing facility at Mohenjodaro with

A typical bathing facility at Mohenjodaro with a drain out to the street. Compare this with the

a drain out to the street. Compare this with

adjacent picture of today.

the adjacent picture of today

washrooms.



Mohenjodaro; they are also found in numbers

Laterines at Harappa, where they conform to the patterns

It was generally assumed outlined above. Somewhat different is the line


of thirteen bathing platforms on the High that the urban dwellers Mound at Lothal. This seems to have been a may have walked A row of bathing platforms and a large well may have been used civic facility, open to outside the city wall to

A bathing platform in UM area at Mo for public washing and bathing (the drains have been added for the nearby **Another bathing platform, also from Mohenjo** to fields **daro.**

henjodaro with blocked up doorway

relieve themselves, as is
leading into the room. The brick floor

was made with carefully fitted flat paved bricks and a smaller catchment drain along the side of the platform. A small step was placed at one side of the plat form, and a ledge of finely fitted bricks protected the base of the wall.

platforms seem to be the chief source of water preservation)
that went into the drainage system, except, of course, for those few days when there was a really good rain.

An peculiar architectural feature at the Moneer site at Mohenjodaro is an apparent modification of the bathing floors. Here they have an interesting added feature. Outside one wall of these washrooms there is usually a small flight of brick steps. They are so



A bathroom in a Mohenjodar house, with a drain connecting to the public drainage system in the adjoining street. A brick on edge with a notch was placed across the drain hole to keep objects from flowing out with the bath water. It is possible that such bathing floors were also used to wash



clothes that may have washed out with the rinse



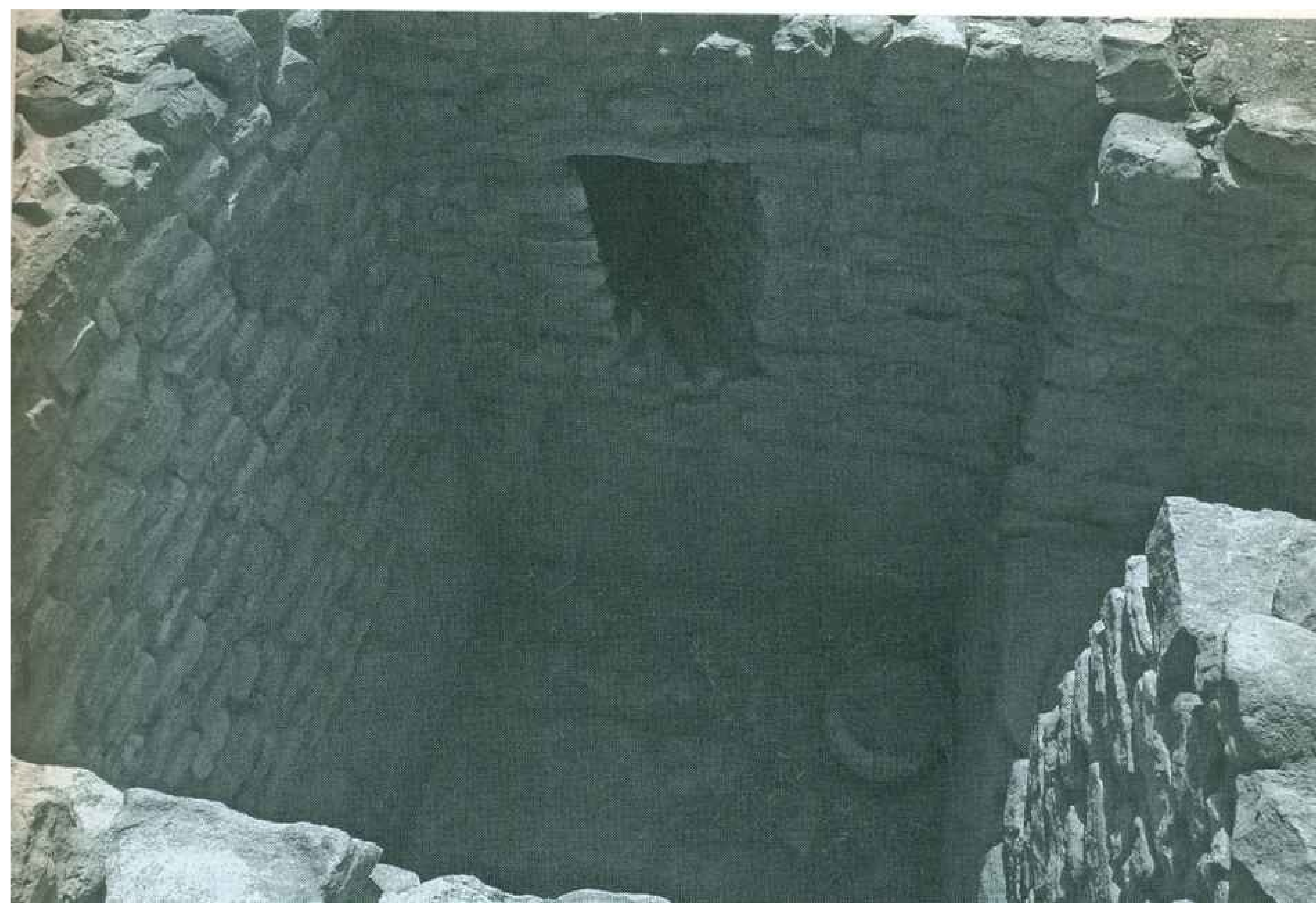
Page 307

A bathing platform in modern Pakistan with a
A modern-day bathing facility in a Punjabi village . As in Mohenjo-daro, the spent water from platform
drain out to the street (hidden by the wall).
the platform exists to the the open drain that runs
Construction style, even the size of the struc**along the adjoining street**

ture, is the same as that of the bathing facilities A typical bathing facility at Mohenjodaro with a drain out to the street. Compare this with

303
at Mohenjodaro the adjacent picture of today
Page 308

found in East Afghanistan as well. It appears if nothing has changed in their construction over the past five thousand years, the same construction, the same dimensions, the same location in the house.



A small stone-lined tank in the upper half of the citadel at Dholavira. This may have been used for bathing in a ritual context. The round stone on the bottom may hjave been a seat or to help the bather step into and out of the basin. On one side is an inlet chute to supply water.

Bathing facilities are in abundance at Mohenjodaro; they are also found in numbers at Harappa, where they conform to the patterns outlined above. Somewhat different is the line of thirteen bathing platforms on the High Mound at Lothal. This seems to have been a civic facility, open to many. The bathing platforms seem to be the chief source of water that went into the drainage system, except, of course, for those few days when there was a really good rain.

Latrines: It was generally assumed that the urban dwellers may havewalked outside the city wall to the nearby fields to relieve themselves, as is commonly done today in much of rural Asia. Therefore, the early excavators at both Mohenjodaro and Harappa did not pay much attention to this essential feature of the Indus cities. Later excavators at Harappa and Mohenjodaro, however, found what appear to be latrines in almost every house. These were separate features, away from the bathing platforms, described above. Private latrines were present in almost every house in Harappa and were probably common elsewhere. A large jar let into the floor provided the latrine itself: often just a squatting hole though some at Mohenjo-daro were furnished with seats. Some of these jars were connected by a drain to the city sewage system, and others had a small hole at the base to allow liquids to drain away. The latrine in one house in Banawali, which seems to have belonged to a prosperous family, was provided with a washbasin.

Clean sand was scattered on the floor of the latrine and periodically an entire new floor was installed. These sump-pot latrines were probably cleaned out quite regularly by a special class of laborers who also would have periodically cleaned out the large garbage bins and sewage drains in the city streets. Many latrines contained a small jar similar to the modern *lota* used throughout Pakistan and Afghanistan for washing aftter using the toilet.

The construction and use of latrines away from the bathing facilities is quite interesting and seems to be specific to the Indus Civilization of the Bronze Age. We see this continuity of concept up to very recent times although there is no evidence of the use of the ‘septic tanks’ described above into the historic times. A number of pottery drainpipes was also found, some of them seemingly connecting with the sewage drains.



Toilets would have been an essential feature in Mohenjodaro, and probably other cities, but the early excavators identified most toilets as post cremation burial urns or sump pots. This brick structure had a hole in the top that was connected to a small drain leading out of the base into a rectangular basin (not reconstructed). Early excavators suggested this might have been a toilet

A large number of triangular terracotta cakes have been found around the residential baths, latrines, and drains in most of the Harappan sites. In a discussion of the significance of these finds, Wheeler once said: "Their great abundance, especially in drains, would be consistent with their use in the toilet, either as flesh rubbers or as an equivalent to toilet paper. Although humrous, this conclusion is not farfetched: throughout the villages of Pakistan, people still use equally abrasive articles to wipe out the sticky stuff.

SANITARY STRUCTURES

The sewage removal systems of the Harappan cities have already been discussed in the last Chapter as an elem.nt of city planning. Here we briefly touch upon two items from structural point of view.

Vertical Drains: One of the noteworthy features of the Harappan residential structures is the vertical drainage system: it is not flimsy or temporary but rather sturdy and permanent. Terracotta roof drains embedded in brickwork of the wall have been noted at Mohenjo-daro. Given the lack of any substantial rainfall in the region, this emphasis on Ancient Pakistan - An Archaeological History

respectable roof drains is only indicative of life which the Harappans spent on the roof of their houses, as indicated before.Evidence shows that not all vertical chutes were closed or covered; some wwere indeed open as they are in most houses in small town Pakistan.Architecturelow ponds just outside the city or in the open

!spaces within the city, in the fashion of numerous cities in modern Pakistan.

As stated before, doorwaysstandards,and windows considerable

technical accomplishment for the Harappans to in

rarely opened out onto the main street but

stall massive corbelled drains to bridge larger open

faced side lanes. The view into the house was

ings in brick masonry, e.g., for covering drains and

blocked by a wall or hallway so that activity roofing doorways. No example of a circular vault or

brick-lined annular shaft has, however, been found.

in the central courtyard was protected from

Both at Harappa as well as at Mohenjodaro, we observe large capacity drainage conduits with corbelled construction to facilitate the drainage of rain water. It is not clear where did this drained water go but it is assumed that it accumulated in shal



As stated before, doorways and windows rarely opened out onto the main street but faced side lanes. The view into the house was blocked by a wall or hallway so that activity in the central courtyard was protected from the view of passersby, a pattern still maintained in traditional homes throughout Pakistan and Afghanistan.Doorways could be a meter-and-a-half in width, spanned by wooden beams over two meters long, with

A vertical terracotta roof drain, embedded in the

the threshold consisting of wood laid over brick. A vertical terracotta roof drain, embedded in the brickwork of the wall, Mohenjodaro. The

the maintained in traditional homes throughoutshaped bricks. Yet, it did not occur to them to go

one step further and have such brick cylinder tilt 90

Pakistan and Afghanistan.Doorways could be

degrees and thus invent the true barrel vault. Con

a meter-and-a-half in width,sidering the timeline of the Harappan Civilization,spanned by

wooden beams over two meters long, withthe corbelled drains are a truly marvels of brickma

sonary as the pictures on this page show.

the threshold consisting of wood laid over brick.

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wells in the courtyards for drawing water,

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There also seem to have been public wells

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We know that the Harappans were familiar with a

view of passersby, a pattern still circular shaft (a well) which was lined with wedge

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Most of the residential houses had their own pipes were made using multiple telescoping
wells in the courtyards for drawing water,**snugly with the next segment.**
There also seem to have been public wellssegments that fit snugly with the next seg
ment. (after Kenoyer)

near open squares for the benefit of those whose houses lacked this amenity. The wells were all lined with brickwork, and Not all drains were ad protective revetments at their mouths covered even at Moto prevent children and domestic animals henjo- daro, as from falling into them.

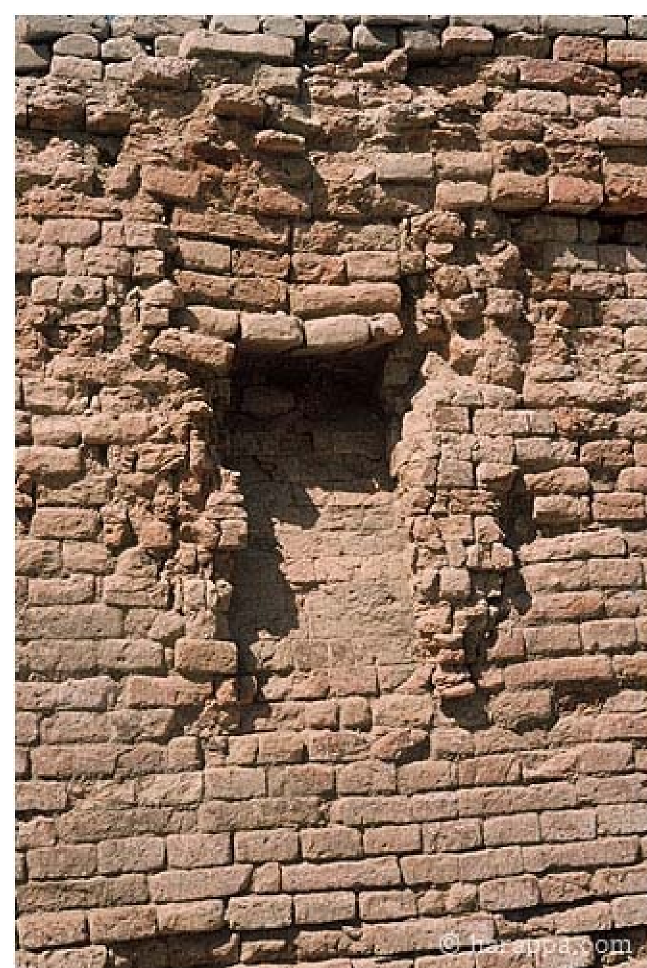
shown in this exam
ple of tapered roof

drain chute from

Corbelled Drains: Both at Harappa as

into the street below.

well as at Mohenjodaro, we observe Both at Harappa as large capacity drainage conduits with with corbelled construction to facilitate the drainage of rain water. It is not clear



where did this drained water go but it is assumed that it accumulated in shallow



daro, as shown in this example of tapered roof 305Not all drains were covered even at Mohenjobelow.

ponds just outside the city or in the open daro, as shown in this example of tapered roof Page 305 drain chute from that emptied out into the street spaces within the city, in the fashion of below.

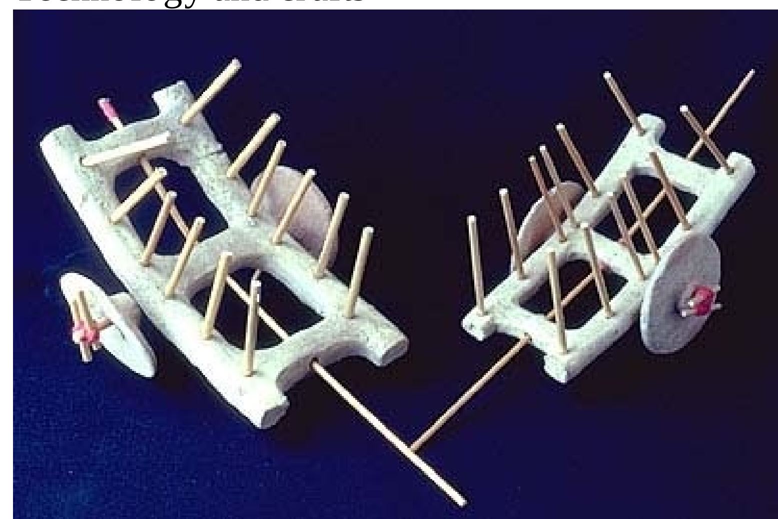
Chapter 14

Crafts and Technology

Technology and Crafts

Chapter 11

Technology and crafts



A model of bullock cart from Chanhu-daro The study of artifacts of early civilizations is

The study of artifacts ethos of the time, which he called the 'Indus ideol
an important aspect of archaeology. The
of early civilizations ogy', an innovative spirit that supported and prostudies of finely crafted art objects and themoted this wide variety of crafts. It was probably economic, socio-political and religiousakin to the spirit which was inherent in the bloomingorganization of the societies who were the
is an important asarticles of daily use help us to understand the

pect of archaeology.
The importance of arts and crafts during the early Islamic period inauthors of these objects. The importance of of such studies lies insuch studies also lies in learning about the the Middle East or to the spirit of the renaissance in

learning about thetechnology that was involved in fabrication Europe in the 17th century A.D.of these items and about the ways and means
technology that was This chapter attempts to review state of techby which the artisan procured their raw
involved
in
materials. The technological and productive
fabricanology and the broad panorama of crafts in the
items which need to be examined
tion of these objects and about the ways and means are: stone, copper-bronze, other metals, andHarappan period. We largely concentrate on themiscellaneous groups of objects like pottery, beads, agriculture and animal husbandary,
by which the artisan procured their raw materials. descriptive aspect of these crafts, raw materials,irrigation, lapidary processes, engineering skills regarding water control, and finally, the

The awareness of these issues and concerns is a theoretical issues involved. The awareness of these issues and concerns is a and the production technologies; specific industries comparatively recent phenomenon incomparatively recent phenomenon in historical scholarship of the region. Apart from the and crafts are dealt with in individual chapters thatfact that the earlier concern was more with the cataloging of the Indus artifacts andhistorical
scholarship of the region. Since there are no writtentheir raw materials than with anything technical and follow and the discussion

on theoretical aspects are

musing about the sources of
records, the detailed study of material culture proeconomical, the earlier writers' range of findings and interpretations were severely left to the next volume (*Harappan Civilization* -
limited by a lack of suitable and chronologically well-defined material data which

vides one of the few sources of information for de*Theoretical and the Abstract*). It should be made
became available only through detailed archaeological investigations in recent years.
termining the nature of the society and for comparclear, however, that this is not an exhaustive cover

ing it to other early cultures.The assemblage of artifacts gathered from various sites of the Harappan Civilization isage of Indus
technology. There is much that couldformidable. The exploitation of resources of stone, metal, clay, ivory, bone, shell, etc, is
In the Harappan Civilization, there was a
full-bodied. The systems of measurement, of building construction, of town planning, not be covered here, and some of it is important. broad
versatility
of
technology
and
and of pyrotechnology, and the artistic endeavors in the painting of pottery or
specialized **Studies of Indus Crafts and Technologies:**fashioning of ornaments, underline the complexity of the culture which produced them.
knowledge employed in producing objects from difEver since the first excavations at Mohenjo-daro,The discovery of fragments of cotton found clinging to a metal tool at Mohenjodaro and

ferent materials. Pyrotechnical techniques werethe impressions of woven cloth on clay discovered at Harappa and Mohenjodaro adds craft activities has been central to all discussions of widespread especially in view of the availability of the structure and organization of this ancient city raw clays and specialized skills developed by craftDuring the period under the present consideration, (2600-1900 B.C.), the need for and the civilization that it represents. The earliest

unique and appealing objects for ritual and political status resulted in the invention of
producers, ranging from the manufacture of simple studies of craft traditions of the Indus Civilizationmany new technologies, such as the coloring of carnelian beads and stoneware bangle
pots to the stoneware bangles. As the crafts known were carried out by the first excavators of the major making, while old technologies were taken to new levels of complexity. Faience
in early periods were absorbed into the urban econtechnology became more refined and ceramic production saw the introduction of novel

omy, Indus artisans, with great ingenuity, honed
their technologies and created a remarkable as
utensils. The new products and imitations resulting from these developments were
cities of Harappa, Mohenjo-daro and Chanhu-daro.
techniques, improved construction of kilns, and new styles of production. Copper and Of these studies, perhaps the most important were
bronze metallurgy became highly specialized for the production of tools, ornaments andthose made by Mackay (1) who assisted Sir John
semblage of artifacts with which we now identify the

civilization. During this period, the development of

large cities greatly affected the development of the industrial sector in the Greater Indus Valley. An im portant aspect of this process was the invention or the adoption of specific styles in material culture, namely, in public and domestic architecture, ceram ics (including pottery and refined personal orna ments such as faience and stoneware bangles), metallurgy, steatite seals, agate and shell orna ments.

Given the largely 'rural' character of the Harappan Civilization, the technological virtuocity of the Harappan people is remarkable. Not only the crafts, production methods, and raw materials from the preceding cultures preserved but tremendous progress in developing new technologies, especially in pyrotechnology, and the utilization of new materi als was made. Since the success of the Indus peo ple in such wide a range of technological pursuits could not have happened by accident, Possehl has proposed that it was institutionalized within the Marshall in the excavations at Mohenjo-daro and then went on to excavate Chanhu-daro. Documentation of crafts has been a topic of long-standing interest in Harappan studies since then. The earlier concern was more with the cataloging of the Indus artifacts and musing about the sources of their raw materials than with anything technical and economical. Furthermore, the range of findings and interpretations were severely limited by a lack of suitable and chronologically well-defined material data which became available only through detailed archaeological investigations in later years.

The situation has, however changed in recent times. For example, researchers have painstakingly reconstructed each of the steps artisans have taken in producing an object. These studies indicate that the Harappans approached crafts with very strong perceptions about production technologies, many of which were holdovers from techniques developed by artisans at Mehrgarh, discussed in detail in Volume II (*A Prelude to Civilization*) of this series and summarized below.The sources of raw materials

The indications of the dyer's workshop in the remains of Mohenjodaro, and certain

interpretive models and that required totally new methods of data collection and

patterns depicted on dresses worn by sculptured figures do, however, suggest that they

analysis. By studying the artistic and utilitarian elements, the technological processes

liked colourful clothing, often embroidered or printed. The technologies and crafts, such as tanning

needed to create such objects have begun to shed new light on the socio-economic, of hide to make leather, cleaning

are being studied more extensively, employing and spinning of the artifacts (9). This stimulated new studies and

multi-disciplinary approaches. Progress on theoretiideological, and political developments that set the foundation for the Indus Civilization. harvesting, and spinning of cotton, weaving and embroidering of woolen and cotton

cal issues is also evident and the interaction of the
cloth, etc. are not visible to us now because the products have perished. We can,

Recent studies of bead making technology, mass production of pottery and bricks,

Indus craft traditions with those of other regions is of the Indus cities were shown to be more than simhowever speculate that these technologies were also of the same high standard as the

being looked into with renewed vigor and interest.smelting of copper and alloying of bronze have looked at the changes in Indus

Recent studies at Harappa, Mohenjo-daro and other civilizations, but were seen as symbols of power

sites, especially those of Kenoyer, Meadows, technology and assessed their impact on the social structure. Kenoyer, Meadow, manufacture and metallurgy are found Ceramic production,and authority that had been created through com Wright, and Vidale, have cleared up some of thePossehl, Chakarabarti, and Ratnagar, among several others, have reviewed these settlements because pottery vessels were necessary for everyday activities of food

confusions regarding the organization of specific
With the availability of refined tools, chronol

technological efforts of the Indus people and this section heavily draws on these

storage, preparation and serving., whereas tools and weapons were needed for farming, ogy of the Harappan Civilization is becoming clearer
hunting and self-defense. The preliminary stages of someand with it the vistas of interpretation are changing. While seals may be one of the more spectacular predominantly at settlements near the source of specific raw materials. For example,

types of objects found in the Indus cities, this same
shell was processed on the coast; copper was mined and probably smelted in the remote crafts as well as the role that these crafts played in

writings. the overall economy of the Indus cities. A more re

cent and comprehensive review is that of Bhan, Vidale, and Kenoyer (3). Another synthesis is that of

Agrawal (4). Technological Virtuosity of the Indus Civilization

progression of changing perspectives has been go

regions near copper ores. Partly processed raw material were then transported to the ing on with most

types of the Indus crafts. Scholars  Terracotta cylindrical beads

The high degree of technological achievements large urban centers where they were manufactured into ornaments, tool, or ritual

objects. earlier excavations and discover new finds through

of the Indus people can be seen in the cutting,

excavations in both Pakistan and India. By studying

polishing, etching, and drilling of the very longSince the success of the Indus people in such wide a range of technological pursuits

technological processes needed to create such obcould not have happened by accident, Possehl has proposed that it was institutionalized
jects scholars have begun to shed new light on the within the ethos of the time, which he called the Indus ideology, an innovative spirit that

especially bronze, the possible use of lost wax

supported and promoted this wide variety of crafts. It was probably akin to the spirit

casting, the quality of the carving of the square

which was inherent in the blooming of arts and crafts during the early Islamic period in tion. For example, recent studies by members of the

stamp seals,

HARP team have focused on Early Harappan (Ravithe Middle East or to the spirit of the renaissance in Europe in the 17

the manufacture of high quality

and Kot Diji Phases) at Harappa, along with comThis chapter attempts to review state of technology and the broad panorama of crafts in

faience, and finally the preparation of well-made

the Harappan period and the next three chapters concentrate on some individual

ceramics, especially stoneware. Equally apparent is the sophistication of the Harappan

tion in cities and large towns. This is because the technologies and crafts. It should be made clear, however, that this is not an exhaustive

ancient crafts of the Indus society have been studengineering. The building and maintenance of such cities as Mohenjodaro and Harappa coverage of Indus technology. There is
ied only within the urban contexts of cities andis sufficient testimony to this skill, with the maintenance of the grid town plan, themuch that could not be covered here,towns and the suburban or rural industrial sites, and some of it is important. Taken this such as those reported in Cholistan area (5,6)), inelaborate drainage system that would have had to be regularly re-elevated as the

Sindh (7)
tra and Haryana, have largely been ignored. In

mated to be 700 at Mohenjodaro

deed, there are only few studies that pertains to the

all together, it is easycontours of the city grew and changed, the digging of wells on a massive scale (estiVidale and Mill have called the "Indus alone!), the engineering and architecturaltechnological virtuosity. production and consumption of crafts in the ruralsophistication of the Great Bath as well as the ordinary residential housing. Of course,areas of the Indus Civilization. These studies are Development of Indus
needed for the understanding of the distribution ofthe making of standardized bricks and the construction of large kilns to fire them speak
raw material and products, and deciphering thefor itself. One must add to this list the technologies involved in crushing and refining ofTechnologies and Crafts

trade networks.
By studying the artistic and utilitarian ele



ores, drilling, polishing of stones, and deep-water sailing, including navigation, boatIt has been shown in Chapter 4 that the ments, the technological processes needed to crebuilding, and maintenance. Theirs was also the work and skill needed to acquire theroots of the Harappan arts and crafts

ate such objects have begun to shed new light on
Basket-marked pottery from Las Bela, **Basket-marked pottery from Las Bela, Baluchistan, 7th** are in the remote past of the region,

the socio-economic, ideological, and political develproper raw materials, some of which were fluxes and catalysts, that are not apparent

opments that set the foundation for the Indus Civilization. Recent studies of bead making technology, mass production of pottery and bricks, smelting of copper and alloying of bronze have looked at the changes in Indus technology and assessed their impact on the social structure. Kenoyer, Meadow, Possehl, Chakarabarti, and Ratnagar, among several others, have reviewed these technological achievements of the Indus people and this section heavily draws on these writings.

As the study of Indus cities shifted to more theoretical issues of social, economic and political organization, the production and use of artistic objects such as seals came to take on a very different light (8). Questions about the symbolic or socio-political meaning of these seals required more

rigorous studies of the production, use and discard

Baluchistan, 7th millennium BC starting from **millennium BC**
Page 313

Development of Indus Technologies and Page 314 **Crafts:** It has been shown in Chapter 5 that the roots of the Harappan art and craft traditions are deep in antiquity, penetrating almost the Neolithic developments in the 7th millennium BC. A lot has been written on this subject. Kenoyer (11) has recently reviewed this literature and described the progression of arts and crafts in the Greater Indus Valley through several millennia prior to the emergence of the Harappan urbanism. Volume II (2) of the present series describes the subject in some greater details, so does Possehl's *Indus Age - The Beginning (*49).

As discussed earlier, the chronology of the Indus Age can be divided into four Eras (12,13) .
non-agricultural technologies which
reflected in their handicrafts and the
items of daily use. There is evidence
Harappan Civilization - The Material Culture for simple mud walled buildings, The
Early Food Producing Era
(ca. 7000-5500 BC),

grass netting, nonwoven fabrics made also commonly referred to as the Neolithic period, is a time when domestic plants and animals are first exploited in the Indus Valley. The *Regionalization Era*, (5500-2600 BC) corresponds to a period of regional cultural development that is subdivided into

Technology and Crafts**!**various phases defined by specific artifact styles and regional cultural interaction.
Excavations at Kot
buildings,
of
soft stone
Technology and Crafts**!**

developments in Baluchistan. The semi
-sedentary agro-pastoral communities
living on the Kacchi plain or in the
Quetta Valley had begun to exploit
domestic plants, such as wheat and
barley, and animals such as sheep,



goat and cattle, probably as early as
eighth millennium BC, and certainly

Burial ornaments made of shell and stone disc
earlier cultures, there are nevertheless significant
beads , Mehrgarh c. 6500 BC (after Jarrige) changes in technology and production that are in
turn linked to changes in stylistic and symbolic aspects of the material culture.of wool and animal hair, the
use of animal skins for varied

Archaeological research in Baluchistan has shown that the semi-sedentary agro-pastoral
compurposes, and fashioning of munities living on the Kacchi plain or in the Quetta

beaded ornaments. Bitumen

Valley had begun to exploit domestic plants, such coated baskets indicate some
as wheat and barley, and animals such as sheep,

expertise in weaving as well as
goat and cattle, probably as early as eighth millen
in fashioning
nium BC, and certainly by seventh millennium BC.of containers. They had also started to develop some selected
These technological
non-agricultural technologies which reflected in their
developments were, of course, handicrafts and the items of daily use. There is evi
over and above the Paleolithic
dence for simple mud walled buildings, grass net
and Mesolithic technology of

ting, nonwoven fabrics made of wool and animal hair, the use of animal skins for varied purposes,
and fashioning coated baskets indicate some expertise in weaving

chert blades and hafted
microlith implements. as well as in fashioning of containers. These tech manipulating stone to fashion
of beaded ornaments. Bitumen tools and weapons, such as
microlith implements. occupation from the very early human
by seventh millennium BC. They had

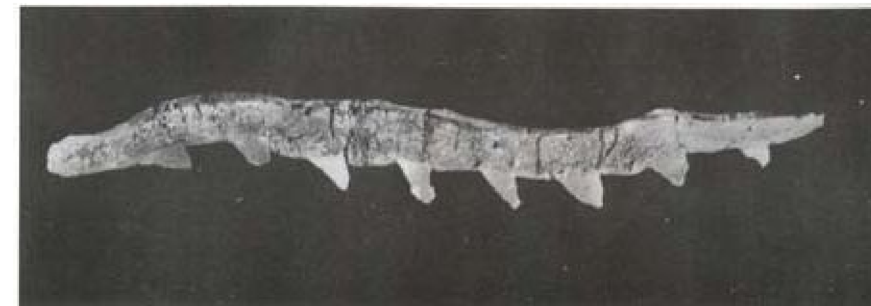


nological developments were, of course, over and also started to develop some selected above the Paleolithic and Mesolithic technology of
The site of Mehrgarh gives a
non-agricultural technologies which
Painted sherd with stylized bull motif, Mehrgarh, c. 4500 manipulating stone to fashion tools and weapons,
unique window into the past
reflected in their handicrafts and the BC (after Kenoyer) such as chert blades and hafted microlith impleitems of daily use. There is evidence



ments (50). through its unbroken for simple mud walled

Burial ornaments made of shell and stone disc occupation from the very early human
Mehrgarh c. 6500 BC (after Jarrige) Burial ornaments made of shell and stone disc
beads , Mehrgarh c. 6500 BC (after Jarrige)settlements to the development of beads , Mehrgarh c. 6500 BC (after Jarrige)
agriculture and animal domestication, of wool and animal hair, theand then toof wool and animal hair, thedevelopment of the
use of animal skins for varied use of animal skins for variedmature agricultural villages. Here, in
purposes, and fashioning of purposes, and fashioning of
the periods following the Neolithic beaded ornaments. Bitumen
beaded ornaments.



(after 5500 BC.), shows an increase in Bitumen coated baskets indicate some
coated baskets indicate some expertise in weaving as well as **Sickle made of chert blades set in bitumen, Mehrgarh, c.** the local production of soft stone
expertise in weaving as well as in fashioning of containers. *after Kenoyer*)Sickle made of chert blades set in bitumen, beads such as steatite and limestone These technologicalMehrgarh, c. 3300 BC (after Kenoyer)in fashioning of containers.

as well as those produced from stones developments were, of course, These technologicalover and above the Paleolithic The site of Mehrgarh in the Kachi plain gives developments were, of course, Page 315and Mesolithic technology ofa unique window into the Indus past through its unover and above the Paleolithic manipulating stone to fashionbroken occupation from the very early human setand Mesolithic technology of

tlement to the development of agriculture and ani
tools and weapons, such as
chert
mal domestication, and then to the development of
manipulating stone to fashion
blades and hafted
mature agricultural villages (14). The early use of



tools and weapons, such as microlith implements. material objects as symbols to define social status chert blades **Painted sherd with stylized bull motif, Mehrgarh, c. 4500** hafted
BC (after Kenoyer)**BC (***after Kenoyer***)** and
The site of Mehrgarh gives a
Diji, Amri, and Nausharo provide evidence for the
settlements to the development of
emergence of anunique window into the past 3500 BC and a transition point at the end of the
and then to the through development its unbroken

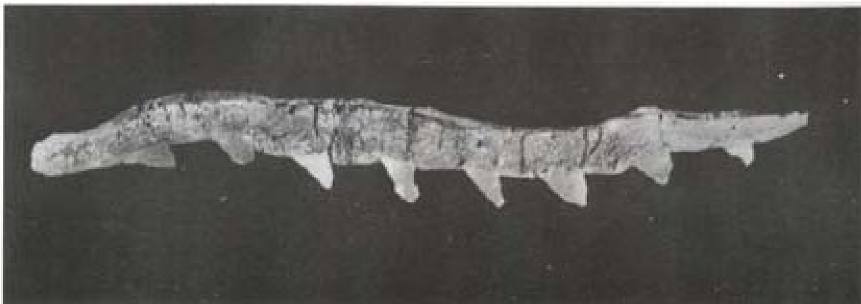
Regionalization Era, around 2800 BC. Recent exmature agricultural villages. Here, in
cavations at Harappa confirm these readings. The the periods following the Neolithic

next Era is called the *Integration Era* (2600-1900

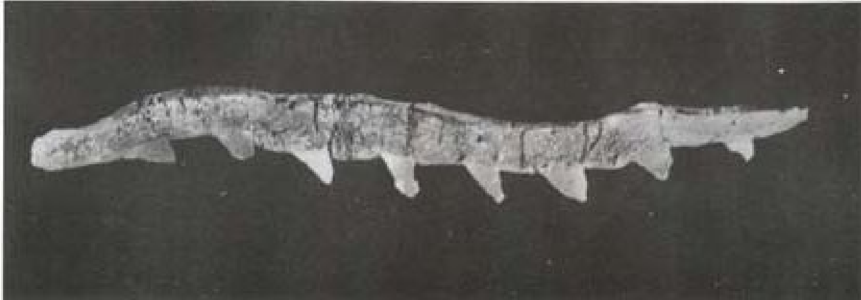
The site of Mehrgarh gives a and power in the Greater Indus Valley can be unique window into the past documented at this site. The earliest occupation through its unbroken reveals a rich assemblage of material culture from

both domestic and burial contexts. Of particular importance are the craft technologies and the Neolithic burials which reflect the economic and ideological patterns during this initial phase of settling down. The types of artifacts that may have been used as utilitarian or symbolic objects are relatively limited, but this may be due in part to the fact that

(after 5500 BC.), shows an increase in

BC) and is the time generally associated with the few permanent materials, such as stone, shell and
the local production of soft stone term "Indus Valley Civilization". The final Era of the
beads such as steatite and limestone

Sickle made of chert blades set in bitumen, bone, were used for the creation of decorative obIndus Valley Tradition is sometimes referred to as
theas well as those produced from stones (1900-1300 BC). During this
time there is evidence for major transformations of



Page 315 the socio-economic and political organization of cities and regional settlements. While there are

Sickle made of chert blades set in bitumen,
some important continuities that link this period with
Mehrgarh, c. 3300 BC (after Kenoyer)308
jects.Mehrgarh, c. 3300 BC (after Kenoyer)

Localization Era At Mehrgarh there is evidence for simple mud walled buildings with four internal subdivisions and numerous burials with often quite elaborate burial offerings (14). In addition to occasional animal sacrifices, these offerings included baskets, stone and Ancient Pakistan - An Archaeological History

bone tools, and a wide range of ornaments such as beads and bangles (15). In the absence of fired pottery, the most important types of containers were baskets and presumably bags made with netting, non-woven fabrics (the *Namda*) or leather. BitumenTechnology and Crafts!local potters and modelers had developed many coated baskets and intricately designed beaded styles of pottery and delicately modeled figurines of ornaments indicate considerable expertise in varihumans and animals (22). The pottery firing was

ous types of basket weaving. The combinations of

that were apparently acquired from long distances. During this time we also see

the

undertaken in updraft kilns as well as in large pit different colors of stone or shell indicate a prefer

earliest use of harder varieties of rock such as agate and jasper that were being

kilns for the production of large quantities of storage

ence for contrasting colors such as unfired black perforated using specialized stone drills or chipping tools. Local manufacture of marinejars. At this point there is no indication of the types

soapstone and white limestone, shell or fired soap
of kilns used for faience production at Mehrgarh/

shell ornaments is also well established. Both bead making and shell working involvestone. Bright orange or purple *Spondylus* shell disc Nausharo or at Harappa. The presence of copper

beads were combined with beads made from blue

non-local materials. In addition to these exotic materials, the local potters and modelers

melting crucibles at Mehrgarh indicates that this

green turquoise,had developed many styles of pottery and delicately modeled figurines of humans and sandstone and even polished copper. Wide shellanimals. The presence of copper melting crucibles at Mehrgarh original source of the raw materials (14,23).indicates that

bangles were worn along with

bracelets and anklets made from tabular beads of white shell or white limestone (16). Natural shell beads from brown and white striped *Engina mendicaria* were also used, often in combi nation with large disc pendants made from the flat spire of the cone shell (*Conus sp.*). Many of these same materials continued to be used in later times and

with the development of more complex technologies for pro duction, some came to be used as important symbolic and wealth objects during the Harappan period (17).

The technologies used to create ornaments were not very complex during this period and involved relatively simple proce





dures of chipping, grinding and
drilling (18). Since no evidence
of manufacture of exotic materiIndus phase, c. 3000 BC
a l s h a s b e e n f o u n d f r o m
Mehrgarh during this early period, it can be as
sumed that ornaments from non-local materials

were produced by craftsmen in distant resourcewas being practiced. The production of faience was known but there is noshell, bone and pottery objects at Mehrgarh. The

varieties of stone beads increase, with new shapes and many different varieties of rock being used to produce attractive ornaments. A new technological
Female figurine found near the surface at Damb Sadaat, Queta Valley, Early In Female figurine found near theTerracotta figurines from Mehrgarh during the Early**dus Phase (***after Fairservis***)**surface at Damb Sadaat, Queta Valley, Early Indus Phase From around 4,500 to 3,300 BC, there is a
(after Fairservis) dramatic increase in the amount of finished objects

and manufacturing debris from all types of stone, non-local materials, several stages of production and more complex technological processes that may indicate the presence of more than one craft specialist. In addition to these exotic materials, the

metallurgyareas and traded to the settlement in finished form indication of the types of kilns used.

(17,19). However, it is not unlikely that communities in the western Baluchistan highlands may have

been active in the manufacture or trading items From around 4,500 to 3,300 BC, there is a dramatic increase in the amount of finished

such as lapis and turquoise beads, marine shell development seen during this period at Mehrgarh beads and native copper beads, all of which have

objects and manufacturing debris from all types of stone, shell, bone and pottery objects

and nearby Nausharo is the production of bluebeen found in early burials at Mehrgarh.

at Mehrgarh. The varieties of stone beads increase, with new shapes and many different

ornaments required fairly high firing temperatures

During the Ceramic Neolithic and later Chalvarieties of rock being used to produce attractive ornaments. A new technological

colithic periods at Mehrgarh (Period III, around 4800 as well as a specialized technology of frit and glaze to 3300 BC.) there is evidence for local production

development seen during this period at Mehrgarh and nearby Nausharo is the production

preparation. The art of pottery-making also sees a of beads from soft stone such as steatite and lime

of blue-green glazed faience beads. The production of such ornaments required fairlychange: new styles and shapes of pottery appear

on the scene.

high firing

stone (20,21). Copper or stone drills were probably

temperatures as well as a specialized technology of frit and glaze

One of the most important forms of symbolic

used on such materials. During this time we alsopreparation. The art of pottery-making also sees a change: new styles and shapes of

see the earliest use of harder varieties of rock such

pottery appear on the scene.

as agate and jasper that were being perforated us
ing specialized stone drills. Local manufacture of marine shell ornaments is also well established

One of the most important forms of symbolic objects are terra-cotta figurines and wethe Neolithic period, the figurines of this period have

many ornaments and decorative features.The deco

(18). Both bead making and shell working involveobserve a dramatic change in the composition of human figurines during this time:

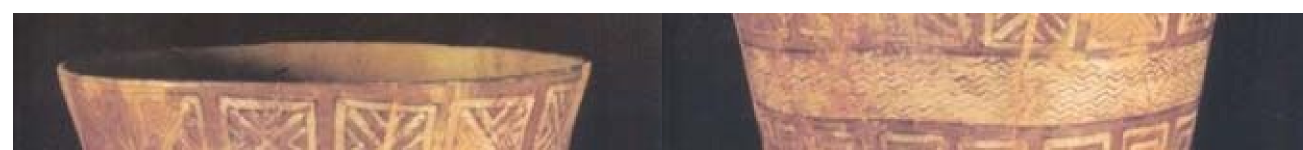
rative techniques include applique, modeling, and

compared to the figurines of the Neolithic period, the figurines of this period have many

ornaments and decorative features. The decorative techniques include applique,

objects are terra-cotta figurines and we observe a

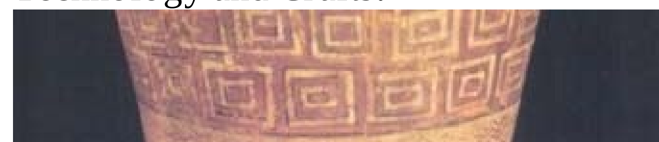
dramatic change in the composition of human figurines during this time: compared to the figurines of



incising as well as painting with red, black or yellow pigments. The diversity of hair styles and ornaments on the figurines undoubtedly reflects the changing patterns of personal ornamentation by the peoples living at the site of Mehrgarh and may indicate increasing status differentiation and ethnic diversity.

During4,600-3,500BC,scatteredagropastoral settlements also became established on the alluvial plains of the Indus. The geographic and environmental differences, coupled with obvious
difficulties in communication, imparted to the cul
tural development of these settlements, that is, the

Technology and Crafts**!**



settlements in the Greater Indus Valley as a whole, modeling, and incising as well as painting with red, black or yellow pigments. The roughened exterior. In addition to the steatite distinct regional differentiation that became particu diversity of hair styles and ornaments on the figurines undoubtedly reflects the changingbeads, they produced short and long biconical Quetta Ware, Amri-Nal, Kulli, and Kot Diji. These

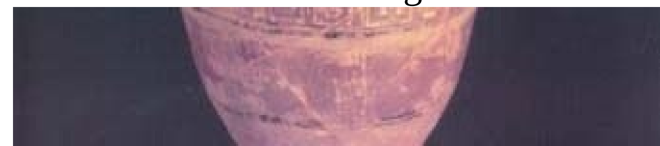


regional cultures are collectively known as thepatterns of personal ornamentation by the peoples living at the site of Mehrgarh and beads of harder stones, such as carnelian, banded

’Early Indus’ or ‘Early Harappan’ phase of the Indus

may indicate increasing status differentiation and ethnic diversity.

Civilization and are thought of as the harbingers of

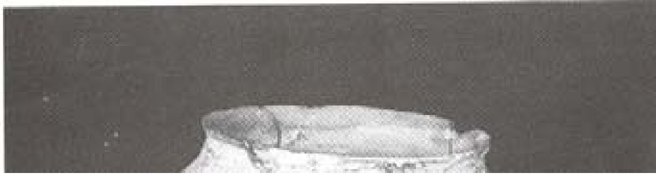


agate, multicolored jaspers, lapis lazuli, and amazonite. The color combinations resulting local production of numerous types of finely crafted objects such as beads, pendants, bangles, button seals, painted pottery and figurines. The versatility Harappan Civilization - The Material Culturecraftsmen is reflected in both the styles of objects created as well as the technologies developed to make unique objects. As Kenoyer and Meadow have shown, beginning with the earliest occupation at the site there is a wide range of techniques. Some of the soft steatite beads were unfired, leaving the natural tan or gray-black color. Other beads were bleached and fired to a white color. Finally some beads were glazed with a blue green glaze that was applied to a

same sort of historical development in the core area of the Indus region representing the pre-urban cultures Another important type of object that is seen at

Terracotta was also used to produce beads in

A tall jar with polychrome geometric



Technology and Crafts this stage and which has a tremendous relevance from these beads would have been quite striking. !to the Harappan Civilization is button seals withmany of the same shapes as the stone beads as crafts assignable to Kot Diji culture: of special interest is the site of Harappa. While the site of Mehrgarh represents the early phase of the Indus settlements covering a long period of time, the recent excavations at the site



of Harappa provide a unique opportunity to follow the

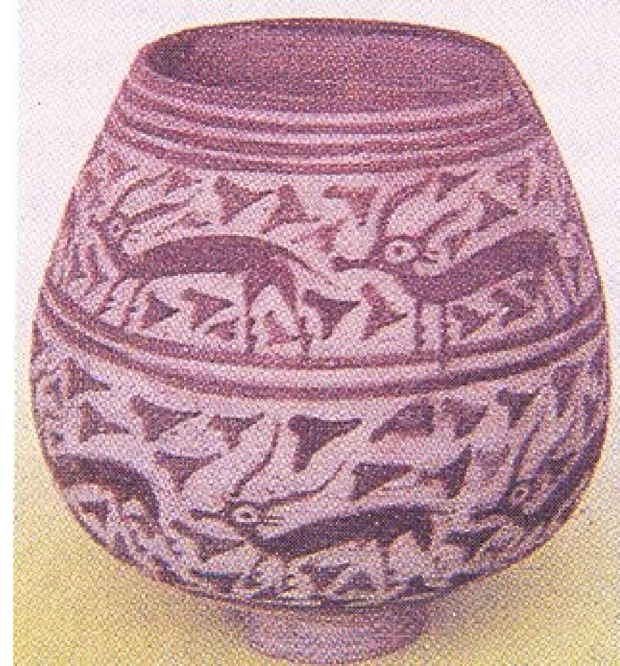


and their transition to an urban phase. Such a

transition is also evidenced at other sites, such as An example of Hakra-ware ceramic from Cholistan, 5th
geometric designs made of terracotta and bone.well as unique forms that were only possible with The designs include stepped cross, concentric clay. For example some of the small terracottamotifs, Mehrgarh, c. 3300 BC as well as various circle and cross motifs, lenticular beads were impressed with fabric on combinations (after Kenoyer) of complicated motifs. These
designs are often repeated in the painted pottery motifs or in shapes of stone inlay that have been **found in various parts of the site. During this period (ca. 4,600 to 3,500 BC), Kot An example of Hakra-ware ceramic Harappan, scattered agro-pastoral settlements also became Diji, and millennium BC (*after Mughal***

from Cholistan, 5th millennium BC At established on the alluvial plains of the Indus, however, one observes the Indus life spanning over (after Mughal)

the coming Harappan urbanism. Settlements also



(which the

appear in profusion in the Ghaggar-Hakra river val

excavators call 'the Ravi Phase), its transition to the and in Kutch and Saurastra.

settlements representing a distinct culture which he

Kot Diji phase and ultimately to the urban Harappan named 'Hakra Ware'.Settlements also appear in profusion
phase. It is, therefore, possible to see the development in the Ghaggar-Hakra river valley,

Valley and Baluchistan, the Kot Diji phase seems to

of crafts and technology over a relatively long period where Mughal discovered a dense

the emerging urban civilization, although no one

cluster of settlements representing a of time just preceding the emergence of Harappan would venture to claim that the Harappan Civiliza
Civilization. These developments can, of course, be
distinct culture which he tion emerged out of the Kot Diji culture alone.

Therenamed

was a rapid expansion in the craft production, the



A fine painted grey ware from Mehrgarh, Balu

A fine painted grey ware from

chistan, 4th Millennium BC

Mehrgarh, Baluchistan, 4th Millennium BC

observed over the course of the life of the city, almost 'Hakra Ware'.The geographic and existing technologies experienced a pronounced to discuss all of the relevant data and it is only posenvironmental the differences, witnessedcoupled sible to focus on a few of the major types of artifacts emergence of several new, hither to fore unknown, in the core areas of the Indus Valley. During thewith obvious difficulties in

technologies. There are several sites in Sindh and

Punjab that exhibit the technology and crafts asRegionalization Era, or Early Harappan period (ca.communication, imparted to the The earliest levels of the site, dating to the Early Indus times, circa 3500 BC, reveal the 3500 to 2800 BC), scattered agro-pastoral settle signable to Kot Diji culture: of special interest is the ments became established on

the alluvial plains of local production of numerous types of finely crafted objects such as beads, pendants, cultural development of these

The virtual explosion in material culture dur the Indus and Ghaggar-Hakra river valleys. As

settlements, that is, the settlements in bangles, button seals, painted pottery and figurines. The versatilitying this stage of development makes it impossible these settlements grew from small villages to large of the early
the Greater Indus Valley as a whole, a Kot Diji type globular vessels from Jalilpur II with craftsmen is reflected in both the styles of objects created as well as the technologies 310 high degree of regional

short neck rims, Early Indus phase (3500-2800 BC)

developed to make unique objects. As Kenoyer
(*Pakistan Department of Archaeology*) differentiation. Ultimately, fourand Meadow have shown, beginning with the pendants. Nal Potterey from Baluchistan with concentric
We must take a special notice of Ancient Pakistan - An Archaeological History pyrotechnology. It can be shown that

transition to the Kot Diji phase and ultimately to the

humans had an early interest in fire and heat. In the beginning this centered on practical,

urban Harappan phase. It is, therefore, possible to

see the development of crafts and technology over functional matters such as cooking, light, and warmth. But there seem to be other

a relatively long period of time just preceding the

dimensions to mankind's interest in fire that go beyond practicality and give them a

emergence of Harappan Civilization. These devel

opments pronounced interest in pyrotechnology, the knowledge of fire. Making of pottery and

course of the life of the city, almost to *ca.* 1500 BC.

glazing or coloring it in diverse effects is one aspect of pyrotechnology. Production of

towns and market areas, they developed a higher degree of regional and internal social differentiation (24). This can be seen in the construction of walled settlements with segregated domestic and public structures (25) and is also reflected in the greater varieties of material culture.

The types of ornaments found in the burials include steatite bead necklaces and bracelets, along with pendants of lapis lazuli, carnelian and other semiprecious stones. The varieties of stone beads increase, with new shapes and many different varieties of rock being used to produce attractive ornaments. It is interesting to note that there are no shell bangles found in the later burials and over time, the numbers of shell bangles found at the site do not show a marked increase as is the case at Harappa (see below).

Another important type of object that appeared in the artifactual assemblage at Mehrgarh was button seals with geometric designs made of terra cotta and bone (19). The designs include stepped cross, concentric circle and cross motifs, as well as various combinations of complicated punctuated or incised motifs. These designs are often repeated in the painted pottery motifs or in shapes of stone inlay that have been found in various parts of the site. The implications of these reTechnology and Crafts,peated patterns is the emergence of a repertoire of

graphic symbols that had local meaning and were used to reinforce social status or possibly ritual ideology.

Steatite was
beads and
notice of


Nal Potterey from Baluchistan with concentric

Nal Potterey from Baluchistan with concentric de

designs, Early Indus Phase

signs, Early Indus Phase

While the site of Mehrgarh represents the



The Bull pot , Quetta Ware, found at

The Bull pot , Quetta Ware, found at Damb Sad

Damb Saddat, Quetta Valley, the Early Indus phase

Allofthebasictechnologiesusedat

lime plaster, making glass and glass objects, and manipulating of faience into desirable objects are some of the other pertinent objectives which the early man tried to achieve. Of course, the whole industry of metallurgy depends on the intimate knowledge of fire and its effect of naturally occurring ores. Indus technology rates quite high in the use of fire in producing not only the artifacts of art and use but also the raw materials, Pyrotechnology was, however, not an invention of the Harappans; the basic elements pre-existed in the Early Indus cultures. The Harappans, nevertheless, especially the smelting of copper and making of bronze alloys as well as the production of faeince. The development of flue-firing kilns for the production innovation. All in all, their depth of knowledge

early phase of the Indus settlements covering a long period of time, the recent excavations at the site of Harappa provide a unique opportunity to follow the same sort of historical development in the core area of the Indus region representing the prelime plaster, making glass and glass objects,

andurban

phase. Such a transition is also evidenced at other
manipulating of faience into desirable objects
sites, such as Amri, Kot Diji, and Naushahro. At are some of the other pertinent objectives which
Harappan, however, one observes the Indus life
the early man tried to achieve. Of course, the
spanning over the Hakra period *ca.* 4500-3500 BC
whole industry of metallurgy depends on the (which the excavators call ‘the Ravi Phase), its intimate knowledge of fire and its effect of 311naturally occurring ores. Indus technology rates
quite high in the use of fire in producing not only the artifacts of art and use but also the raw

Mehrgarh and Nausharo appear to be present at in pyrotechnology is of particular interest for the historians of science and technology.

Harappa and several other sites during the Early Harappan period. The major difference between

While some scholars have argued for a sudden

these sites is the fact that at Harappa there is a

long-term occupational continuity between the diftechnologies associated with the urban era of the Indus Valley civilization around 2600

ferent periods, a gradual increase in the diversity of crafts and an increase in the overall scale of pro

duction. By the end of the Early Harappan period Page 321the site of Harappa has grown to over 25 hectares and is clearly divided into two mounds with massive mud brick perimeter walls around both parts of the site. Craft activities have been found in both of the mounds and include a wide variety of exotic materials and complex technologies. Steatite was being brought from distant resource areas and made into various types of beads, some of which were glazed. Steatite seals with script and animal motifs were carved and fired at the site. Numerous types of colored jasper, agate, carnelian and other varieties of rock were being brought in their raw form and made into beads and pendants.

The earliest levels of the site, dating to the Early Harappan times, *ca.* 3500-2500 BC, reveal the local production of numerous types of finely crafted objects such as beads, pendants, bangles, button seals, painted pottery and figurines. The ver

highly polished and incised surfaces. In some cases, multiple bangles were joined together while Harappan Civilization - The Material Culturestill unfired to form a single, wide bangle decorated Technology and Crafts! with intricate carved designs, in the style of a *Kara* satility of the early craftsmen is reflected in both the

both sides to create a patterned surface. Other terracotta beads were pinched with the styles of objects created as well as the technologies
fingers or palms of the hands, leaving the patterned lines of the maker's hands on thedeveloped to

make unique objects. As Kenoyer and
surface of the bead. Since many of the beads were also carefully smoothed to remove

Meadow have shown, beginning with the earliest
Steatite seal from Harappa, Kot Diji
occupation at the site there is a wide range of beadPhase, c. 2800 BC (after fingerprints, we can assume that the patterned surfaces were left intentionally shapes and manufacturing techniques. Some of theKenoyer)
soft steatite beads were unfired, leaving the natural
the later part of the Kot Diji phase are made from
type bracelet, still worn by the ladies of Iran,
finely ground and refired frit that appears to be simi
Afghanistan, Pakistan, and India.
lar to the compact faience documented from the
At Harappa, terracotta animal and human figurines following Harappan Period (29). This form of high quality faience is found only in the Indus Valley and
become more common during the Kot Diji Phase
not in other contemporaneous cultures, such as
and some of them have been found painted black or
Mesopotamia or Egypt.red designs. Some of the bull figurines have
During the Kot Diji phase (3,200 to
tan or gray-black color. Other beads were bleachedTechnology and Crafts**!** The production of faience at Harappa repre
2,800 BC) there is evidence at Harappa painted bands and stripes on their legs and hump, just like those created by the peoplesand fired to a white color. Finally some beads were sents a highly specialized technology that requiredfor faience bead production to create of southern Baluchistan several centuries ago. There is, however, much less variety in both sides to create a patterned surface. Other terracotta beads were pinched with the
glazed with a blue green glaze that was applied to a the intensive processing of materials and firing at
microbeads as well as larger lenticular human figurine styles found at Harappa compared to sites such as Mehrgarh androughened exterior. In addition to the steatite beads,fingers or palms of the hands, leaving the patterned lines of the maker's hands on the
they produced short and long biconical beads of
surface of the bead. Since many of the beads were also carefully smoothed to remove
harder stones, such as carnelian, banded agate,technique used for
fingerprints, we can assume that the patterned surfaces were left intentionally
made from finely ground and refired frit
decoration. In Harappa it is possible
that appears to be similar to the compact have During the Kot Diji phase (3,200 to faience documented from the following that fugitive pigments may
been used to decorate figurines. 2,800 BC) there is evidence at Harappa Harappan Period. This form of high quality
Such painting techniques are much
faience is found only in the for faience bead production to create
Indus Valley
faster than applique modeling, but
and not in other

are not often preserved microbeads as well as larger lenticular contemporaneous cultures, such as

archaeologically. and biconical shapes. The faience beadsMesopotamia or Egypt in the later part of the Kot Diji phase are

The manufacture of seals shows a dramatic change during the later part of the Early All of the basic technologies used at made from finely ground and refired frit Indus or Kot Diji Phase. The early button seals made of carved bone are replaced with Mehrgarh and Nausharo as well as Technology and Crafts**!**



that appears to be similar to the compact carved soapstone or steatite seals, having geometric incised design. Some of these seals those practiced by the people of Kot newer technologies at hand. Each different craft contributed in some way to the overall are bleached white and glazed to create a hard surface suitable for repeated stamping. Diji culture elsewhere up to the very faience documented from the following



structure of the Indus cities, by linking some communities and distinguishing others. of highThe discovery of a terracotta sealing of a square seal with script and a geometric or southern tip of Sind, appear to be Harappan Period. This form Complex technologies and rare materials allowed the creation of valuable objects that
plant motif indicates that they were in fact used for such purposes. An unfinished seal
present at Harappa during the Early

quality
Bone tools from the Early Indus period (c. 3300-2800
BC) from Harappa (after Kenoyer)served to differentiate the ruling elites from the common people.
At the same time,
Indus Valley **)**
Beads from Hakra/Ravi Phase, Harappa, c. 3300Indus phase. The major difference symbols of Indus religion and culture were incorporated into pottery, ornaments andand not in otherwith an elephant motif also provides the earliest evidence for the local manufacture and **Beads from Hakra/Ravi Phase, Harappa, ca. 3300 -2800** contemporaneous cultures, such as
-2800 BC (after Kenoyer)
everyday tools in a way thatbetween Harappa and other sites is the fact that at Harappa there is a long-term helped to unite people within occupational continuity between the different periods, a gradual increase in the diversity the urban centers and linkMesopotamia or Egypt
of crafts and an increase in the overall scale of production.
use
of
The manufacture of seals shows a dramatic change during the later part of the Early
them with distant rural
communities.
By the end of the Early Indus period, the site of Harappa has grown to over 25 hectares
Indus or Kot Diji Phase. The early button seals made of carved bone are replaced with used
for
carved soapstone or steatite seals, having geometric incised design. Some of these seals
began during the Early Indus
are bleached white and glazed to create a hard surface suitable for repeated stamping.
period (3500 – 2600 BC)
The discovery of a terracotta sealing of a square seal with script and a geometric or
concrete
became more complex as the
plant motif indicates that they were in fact used for such purposes. An unfinished seal
urban workshops developed
Stone beads from Harappa, Hakra/Ravi Phase, ca. 3300-
2800 BCnew technological processes with an elephant motif also provides the earliest evidence for the local manufacture and
use of large symbolic animals on the steatite seals.using new varieties andtime, but the diversity of copper tools, utensils and ornaments and the presence of combinations of rawvarious types of gold beads and pendants from the Early levels suggests that such craftsmulticolored jaspers, lapis lazuli, and amazonite.New styles of In conjunction with the use of materials.
The color combinations resulting from these beads objects were produced toseals there is also evidence forreflect the synthesis of many



Coiled impression of the bottom of a basket at Harappa
Coiled impression of the bottom of a basket at Harappa from Kot Diji Phase, c. 2800 BC (after

Kenoyer)
from Kot Diji Phase, c. 2800 BC (*after Kenoyer*) would have been quite striking. Terracotta was also the
There is also evidence for various types of bangle manufacture in the Early Indus phase
used to produce beads in many of the same shapes and use of different regional cultures, but even though there is considerable uniformity in style at Harappa using exotic materials such as marine shell and local materials such ascubical limestone weights, thatas the stone beads as well as unique forms that high temperatures to achieve a glassy, compact
terracotta. Both wide and narrow bangles were made from the marine shell throughout the greater Indus region, specific ornaments and other objects reveal
would been lenticular beads were
pressed with fabric on both sides to create a patweighing valuable commodities
have
were only possible with clay. For example some of
used
for *Turbinella* substance with a shiny bluegreen glaze. While faimportant regional variations. Harappa and Mohenjodaro have distinct regional styles of the small terracotta im
ience is documented from Mehrgarh and also from

ceramics, which can be contrasted with those of Kulli region in Baluchistan. The larger Nausharo during this period, it is not known if it was Page 319 or for taxation in the Early Indusurban centers and some smaller regional settlements became primary manufacturing terned surface. Other terracotta beads were made using the same techniques as found at

phase.
There
is
no
concrete
pinched with the fingers or palms of the hands,

centers, thereby creating and controlling access to items that were essential or desirable Harappa. Finished copper tools and weapons have for everyday activities as

leaving the patterned lines of the maker's hands onleaving the patterned lines of the maker's hands onbeen found at Harappa, and it is assumed that
evidence for copper or gold
the surface of the bead. Since many of the beads
working at Harappa during this
were also carefully smoothed to remove finger
some copper working was going on at the site, butwell as for ritual purposes
2800 BC
and social status.
so far no production areas have been excavated for time, but the diversity of copper tools, utensils and ornaments and the presence of the Early Harappan Phase. However, recent excaThis survey touched upon
prints, we can assume that the patterned surfaces vations of the Harappan Phase copper working ar
were left intentionally.various types of gold beads and pendants from the Early levels suggests that

such crafts aspects of
During the Kot Diji phase (3,200 to 2,500 BC)
were being practiced at the site.
there is evidence at Harappa for faience bead pro
eas (27) and the large number of copper objectsmanufacturing technology, recovered from the earlierexcavations provide the raw materials, and the
duction to create microbeads as well as larger lenstrong evidence for a long tradition of copper andartifacts produced. WeThere is also evidence for various types of bangle manufacture in the Early Indus phase
ticular and biconical shapes. The faience beads inbronze working at the site (28).largely concentrated on two at Harappa using exotic materials such as marine shell and local materials such as 312 main locations: Mehrgarh terracotta. Both wide and narrow bangles were made from the marine shell *Turbinella* for the



remote beginnings of the Indus technological Page 319 base, and Harappa for the

There is also evidence for various types of bangle manufacture in the Early Indus phase at Harappa using exotic materials such as marine shell and local materials such as terracotta. Both wide and narrow bangles were made from the marine shell *Turbinella pyrum* using simple techniques of incising with stone tools, grinding, and polishing. Shell bangles are relatively rare during the early pre-Harappan phase, but gradually become more

Technology and Crafts !common during the Kot Diji and later Harappan Phase. Terracotta bangles were hand formed and BC, the current evidence, as presented in the above, suggests that this was not the case. the exterior was pinched to create a raised ridge. In

technologies
Valley,

the

and the Carnelian and lapis lazuli beads and pendant, Bakar

Carnelian and lapis lazuli beads and pendant, Bakar Buthi, Hab Valley, southern Baluchistan, the Early

Buthi, Hab Valley, southern Baluchistan, the Early Indus

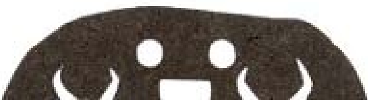
Indus phase

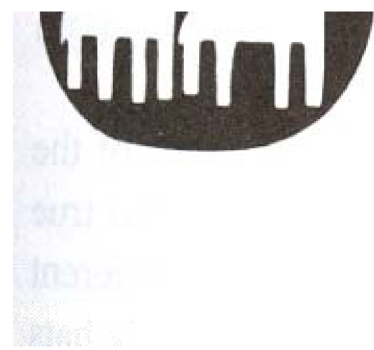
phase

the result of rapid political or ideological changes. the later levels (circa 3000-2800 BC), the variety of It has been shown above that most of the Harappan crafts were already practiced in terracotta bangles increases dramatically to include

Early Indus cultures and some even before: the excavations at Mehrgarh, Kot Diji, flat painted bangles, rounded bangles, and one hav









ing incised decorations. While at first most of the
Amri, Nal, Naushahro, and other bangles were made with red fired terracotta, in the
sites in Baluchistan and Sind are
later levels there are gray-fired bangles with highly the testimonials. Recentpolished and incised surfaces. In some cases, mul
excavations at Harappa testify to

tiple bangles were joined together while still unfired to form a single, wide bangle decorated with intrithe fact that similar cate carved designs, in the style of adevelopments were taking place *Kara* type bracelet, still worn by the ladies of Iran, Afghanistan, Pakistan, and India.

in Punjab as well. There were, however, some important
The manufacture of seals shows a dramatic
differences, of which three stand
change during the later part of the Early Harappan
out for attention, in comparing
or Kot Diji Phase. The early button seals made of
after Durani
)
the Harappan Civilization with
carved bone from the Ravi phase (27) are replaced with carved soapstonethe regional cultures of the Earlyhaving
geometric incised designs (30). Some of theseIndus era. First, we note a degree of uniformity and standardization throughout the seals
are bleached white and glazed to create aIndus realm during the Harappan period. Second, we notice mass-production for some
hard surface suitable for repeated stamping. The
objects of daily use. Third, we observe a high level of conservatism in techniques as discovery of a terracotta sealing of a square sealwell as form and style, resulting very slow changes in technology.with script and a geometric or plant motif indicates
The urban centers were a totally new context for interaction and display, and, as the that they were in fact used for such purposes. An
unfinished seal with an elephant motif also provides
following few chapters will show, the Indus artisans met the challenge by creating a the earliest evidence for the local manufacture andwide variety of utilitarian and ornamental objects, using the pre-existing as well as use of large symbolic animals on the steatite seals .

With the use of seals there is also evidence for the manufacture and use of cubical limestone weights, that would have been used for weighing valuable commodities or for taxation (30). There is no concrete evidence for copper or gold working at Harappa, but the diversity of copper tools, utensils

and ornaments and the presence of various types of gold beads and pendants from the Early levels suggests that such crafts were also being practiced at the site.

There is also evidence for various types of bangle manufacture using exotic materials such as marine shell and local materials such as terracotta Both wide and narrow bangles were made from the marine shell *Turbinella pyrum* using simple techniques of incising with stone tools, grinding, and polishing. Shell bangles are relatively rare during the Ravi Phase, but gradually become more common during the Kot Diji and later Harappan Phase. Terracotta bangles were hand formed and the exterior was pinched to create a raised ridge. In the later levels of the Ravi Phase (*ca.* 3000-2800 BC) and the subsequent Kot Diji Phase (2800-2600 BC), the variety of terracotta bangles increases dramatically to include flat painted bangles, rounded bangles, and one having incised decorations. While at first most of the bangles were made with red fired terra



Kot Diji phase terracotta bangles include many styles and incised and painted decorations. Grey bangles were produced in kilns with a reducing atmosphere and red bangles were fired in an oxidizing atmosphere

cotta, in the later levels there are grey-fired bangles with highly polished and incised surfaces. In some cases, multiple bangles were joined together while still unfired to form a single, wide bangle decorated with intricate carved designs.

At Harappa, terracotta animal and human figurines become more common during the Kot Diji Phase and some of them have been found painted black or red designs. Some of the bull figurines have painted bands and stripes on their legs and hump, just like those created by the peoples of southern Baluchistan several centuries ago. Ram figurines sometimes have holes to attach wheels so that they can be pulled as a toy. One human female figurine has a necklace with pendants painted

Page 322[313] around her neck and is wearing a skirt made with a plaid or checkered design. There is, however, much less variety in human figurine styles found at Harappa compared to sites such as Mehrgarh and Nausharo, where appliqué is an important technique used for decoration. In Harappa it is possible that fugitive pigments may have been used to decorate figurines. Such painting techniques

are much faster than applique modeling, but are not often preserved archaeologically.

By the end of the Early Harappan period, the site of Harappa has grown to over 25 hectares and is clearly divided into two mounds with massive mud brick perimeter walls around both parts of the site. Craft activities have been found in both of the mounds and include a wide variety of exotic materials and complex technologies. Steatite was being brought from distant resource areas and made into various types of beads, some of which were glazed. Steatite seals with script and animal motifs were carved and fired at the site. Numerous types of colored jasper, agate, carnelian and other varieties of rock were being brought in their raw form and made into beads and pendants.

On the basis of this brief review it is possible to conclude that some craft technologies came to be associated with status, symbol and power in the Indus valley while others remained basically utilitarian. During the Early Food Producing Era, most of the ornaments and symbolic objects appear to have been brought to the site of Mehrgarh as finished objects. In the following Regionalization Era, the trade in raw materials and the emergence of local production centers is seen at sites along the foothills as well as in the middle of the plain.

While some scholars have argued for a sudden emergence of a vast array of technologies associated with the urban integration of the Indus Valley civilization around 2600 BC (31), the current evidence suggests that this was not the case. The contrast between the Early Harappan and Harappan phase is not so much the presence or absence of specific technologies, but rather the ways in which specific technologies were used. During the Kot Diji Phase, around 2800 BC, we see the first elaboration of technologies such as faience working and seal carving. These crafts were undoubtedly associated with the emergence and consolidation of new social groups that used specific types of artifacts to distinguish themselves and their ideologies. The presence of similar crafts in the two adjacent walled areas at Harappa suggest that crafts played a very important role in legitimation of competing merchants and other elites.

At both Mehrgarh/Nausharo and Harappa the processes by which certain crafts came to be manipulated and controlled by elites appears to have been a relatively gradual process, and not the result of rapid political or ideological changes. For instance, the technology for producing high quality compact faience may have been established by 2800 BC at Harappa, but still this did not become a common technology until some 200 years later, during the utrban phase of the Indus cities (32). Similarly, the development of gold and copper working, shell bangle making, agate bead making or even seal carving techniques were already well established during the Kot Diji period, but the elaboration of these technologies did not begin until after 2600 BC, during the urban Phase.

The gradual development and spread of important technologies is undoubtedly linked to more fundamental social processes that were going on during the initial phase of urban development. The ability to create powerful symbols was something that could only be done through special technologies or by using specific raw materials that were not easily accessible to the common people (17). Therefore, the crafts that became most important for reinforcing social and ritual status were ones that could be efficiently controlled by new elites and powerful merchants of the Indus cities. While the knowledge of specific craft technologies were probably passed on from one generation to the next through kin networks and various forms of ritual practice , the access to specific materials could have been carefully regulated by controlling trade (33). At both Harappa and Nausharo, the building of massive mud brick walls around the settlements would have been the most effective way

to control the access to raw materials. The walls and gateways would also have allowed for control of the export trade in finished commodities.

It has been shown above that most of the Harappan crafts were already practiced in Early Harappan cultures and some even before: the excavations at Mehrgarh, Kot Diji, Amri, Nal, Naushahro, and other sites in Baluchistan and Sindh are the testimonials. Recent excavations at Harappa testify to the fact that similar developments were taking place in Punjab as well. There were, however, some important differences, of which three stand out for attention, in comparing the Harappan Civilization with the regional cultures of the Early Harappan era. First, we note a degree of uniformity and standardization throughout the Indus realm during the Harappan period. Second, we notice mass-production for some objects of daily use. Third, we observe a high level of conservatism in techniques as well as form and style, resulting very slow changes in technology.

The urban centers were a totally new context for interaction and display, and, as the following few chapters will show, the Indus artisans met the challenge by creating a wide variety of utilitarian and ornamental objects, using the pre-existing as well as newer technologies at hand. Each different craft contributed in some way to the overall structure of the Indus cities, by linking some communities and distinguishing others. Complex technologies and rare materials allowed the creation of valuable objects that served to differentiate the ruling elites from the common people. At the same time, symbols of Indus religion and culture were incorporated into pottery, ornaments and everyday tools in a way that helped to unite people within the urban centers and link them with distant rural communities.

Cities such as Harappa and Mohenjo-daro, in addition to their political and ritual functions, appear to have become centers for trade and production. In the workshops that were distributed at the edges or in the core of these cities, we see the development of distinctive styles of utilitarian and ornamental objects. The most common objects preserved in the archaeological record are pottery, beads, bangles and various metal tools and ornaments. However, we must remember that the production of perishable items such as fabrics, leather, woodcraft and basketry undoubtedly played an important role in theres cities, much as they do in the urban centers of modern Pakistan.

Craft specialization that began during the Early Harappan period (3500 – 2600 BC) became more complex as the urban workshops developed new technological processes using new varieties and combinations of raw materials. New styles of objects were produced to reflect the synthesis of many different regional cultures, but even though there is considerable style throughout Indus region, specific ornaments and other objects reveal important regional variations. Harappa and Mohenjodaro have distinct regional styles of ceramics, which can be contrasted with those of Kulli region in Baluchistan. The larger urban centers and some smaller regional settlements became primary manufacturing centers, thereby creating and controlling access to items that were essential or desirable for everyday activities as well as for ritual purposes and social status.

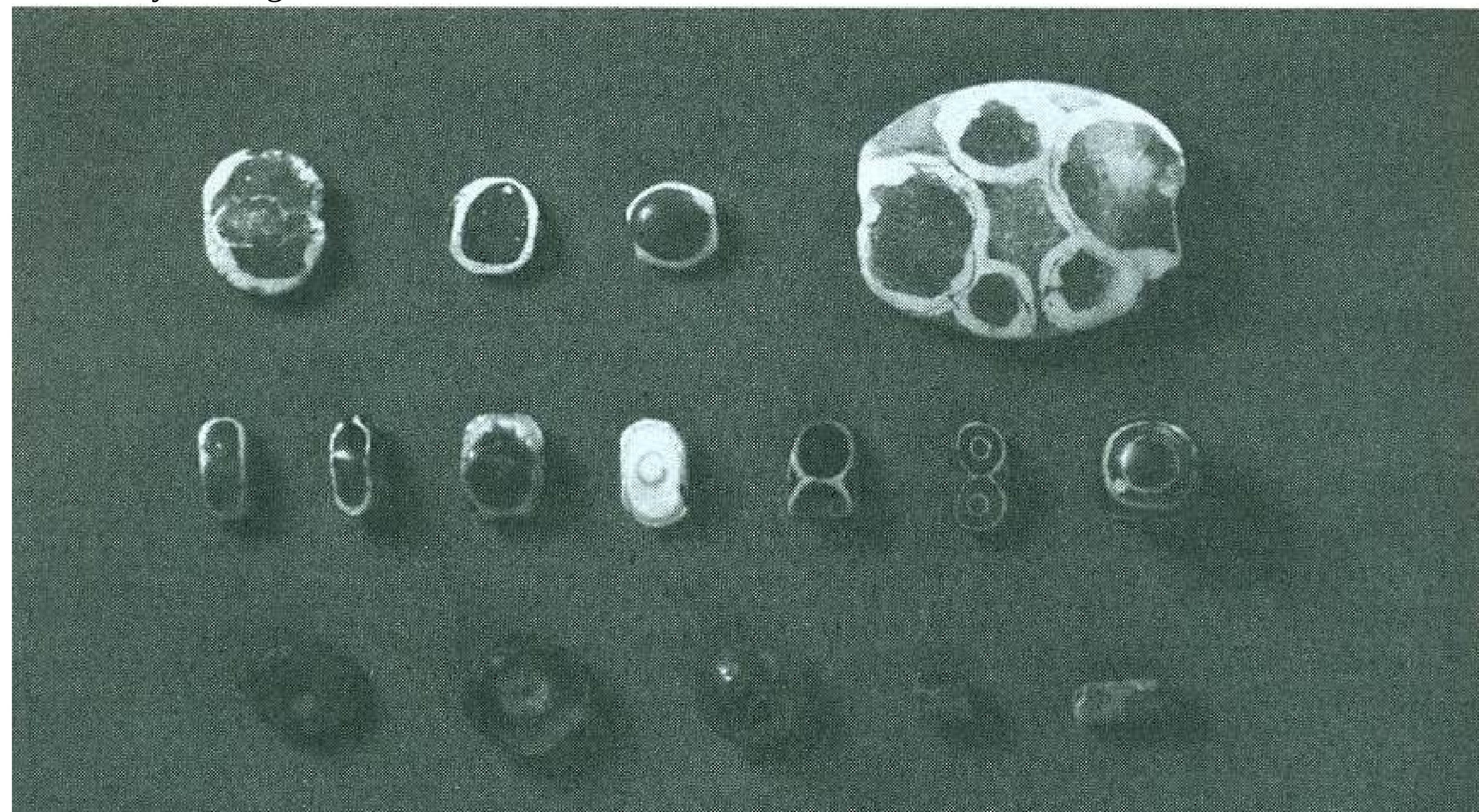
This survey touched upon only a few aspects of manufacturing technology, the raw materials, and the artifacts produced. We largely concentrated on two main locations: Mehrgarh for the remote beginnings of the Indus technological base, and Harappa for the continuation of the Early Indus technology into the Harappan phase. It would have been nice to have similar data from Mohenjo-daro but nothing is so far available from there that can be traced back before the Harappan period itself.

We have not touched upon the many developments in pottery making and decoration at Harappa and at

other locations during the Early Harappan period or before, but it is important to note that the use of the potter's wheel becomes dominant by the end of the Kot Diji Phase. Along with wheel thrown pottery, mold-made and handformed pottery continued to be produced for specific shapes and functional types. These developments have been treated in details in Volume II (2). The developments in metallurgy and metal artifacts have also not been discussed in any detail, neither the architecture and construction material. All these topics are important in linking the Harappan artifactual technology with that of the Kot Dijian Early Indus and further on to that of Mehrgarh and Naushahro. Nevertheless, this brief survey of only a few segments of Indus technology should give the reader a flare of this connection.

Technological Virtuosity of the Indus Civilization: During the Harappan phase, some technologies reached very high levels of expertise. The ability to create new substances out of more mundane raw materials was highly developed and there is evidence for the trade of indus objects as far as Mesopotamia and possibility Egypt. The high degree of technological achievements of the Indus people can especially be seen in the cutting, polish

uniformity in the greater



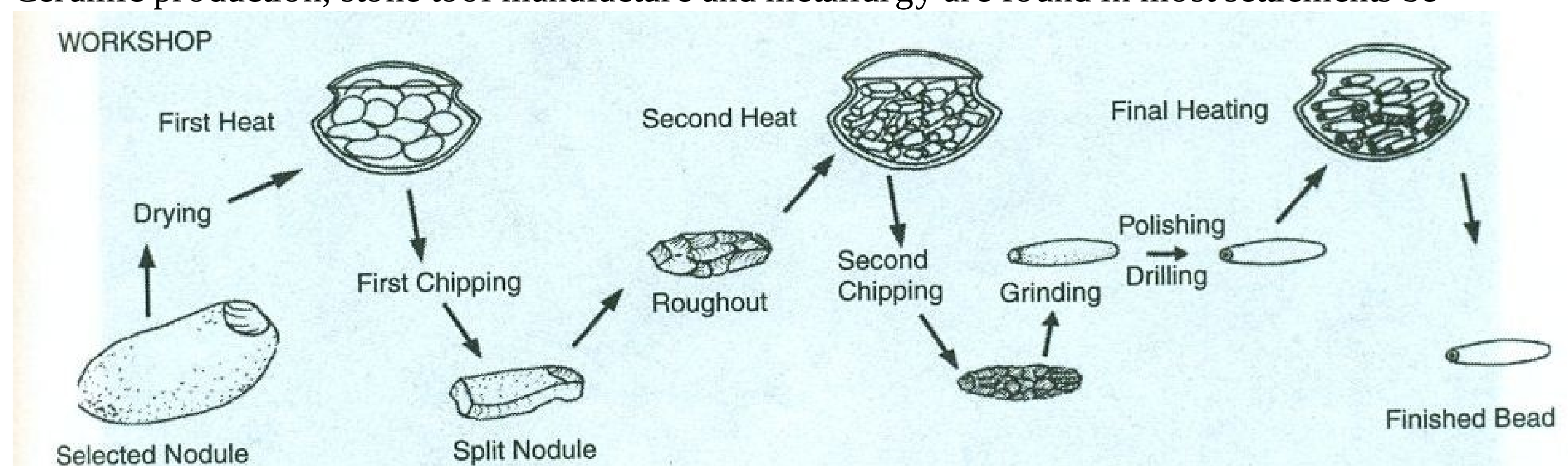
Carnelian and faience beads from Harappa (HARP)

ing, etching, and drilling of the very long carnelian beads, the preparation of metal alloys, especially bronze, the possible use of lost wax casting, the quality of the carving of the square stamp seals, the manufacture of high quality faience, and finally the preparation of well-made ceramics, especially stoneware. Equally apparent is the sophistication of the Harappan engineering. Of course, the making of standardized bricks and the construction of large kilns to fire them speak for itself. One must add to this list the technologies involved in deep-water sailing, including navigation, boat-building, and maintenance. Theirs was also the work and skill needed to acquire the proper raw materials, some of which were fluxes and catalysts, that are not apparent parts of the finished product.

The assemblage of artifacts gathered from various sites of the Harappan Civilization is formidable. The exploitation of resources of stone, metal, clay, ivory, bone, shell, etc, is full-bodied. The systems of measurement, of building construction, of town planning, and of pyrotechnology, and the artistic endeavors in the painting of pottery or fashioning of ornaments, underline the complexity of the culture which produced them. The discovery of fragments of cotton found clinging to a metal tool at Mohenjo-daro and the impressions of woven cloth on clay discovered at Harappa and Mohenjo-daro adds another dimension to the technological aspects of the civilization. The discovery of silk thread (39) is another testimony of the Harappan's resourcefulness and their knack for exploitation of every resource available in nature.

During this period (2600-1900 B.C.), the need for unique and appealing objects for ritual and political status resulted in the invention of many new technologies, such as the coloring of carnelian beads and stoneware bangle making, while old technologies were taken to new levels of complexity. Faience technology became more refined and ceramic production saw the introduction of novel techniques, improved construction of kilns, and new The study of weaving techniques is underdeveloped because of poor preservation and the small number of surviving cloth remains or their impressions. Weavers worked with animal fibers and plants including cotton, linen, and jute, producing basketry, cloth, and other woven items. In distinction to the "hard" remains of pottery and stone objects, textiles are "soft" and do not preserve under the hot and humid environmental conditions of the Indus. The figure above is an example of the impression on a clay pot of a cloth woven of jute in a simple weave, in which the structure of the cloth survived the kiln firing. It is unusual for the structure of a fiber and weave to be preserved in this manner. One possibility, based on replicative experiments (34) is that cloth wetted in clay wash was placed on the ceramic to hold its shape. Before the pot was fired, clay crept into the spaces between the fibers, leaving an impression of the weave and fiber.

Ceramic production, stone tool manufacture and metallurgy are found in most settlements be



Reconstruction of carnelian bead production. Redrawn from Kenoyer and reproduced from Wright (34)

styles of production. Copper and bronze metallurgy became highly specialized for the production of tools, ornaments and utensils. The new products and imitations resulting from these developments were distributed far and wide throughout the Indus region, but the actual developments in technology were probably taking place in the largest cities, such as Harappa, Mohenjo-daro, and Chanhu-daro.

The handiwork in more vulnerable organic substances has not survived and we are left to guess what kind of furniture they used, or what varieties of textile patterns they liked. The indications of the dyer's workshop in the remains of Mohenjodaro, and certain patterns depicted on dresses worn by

sculptured figures do, however, suggest that they liked colorful clothing, often embroidered or printed. The technologies and crafts, such as tanning of hide to make leather, cleaning and spinning of wool, cultivation, harvesting, and spinning of cotton, weaving and embroidering of woolen and cotton cloth, etc. are not visible to us now because the products have perished. We can, however speculate that these technologies were also of the same high standard as the other enumerated above. cause pottery vessels were necessary for everyday activities of food storage, preparation and serving., whereas tools and weapons were needed for farming, hunting and self-defense. The preliminary stages of some crafts were practiced predominantly at settlements near the source of specific raw materials. For example, shell was processed on the coast; copper was mined and probably smelted in the remote regions near copper ores. Partly processed raw material were then transported to the large urban centers where they were manufactured into ornaments, tool, or ritual objects.

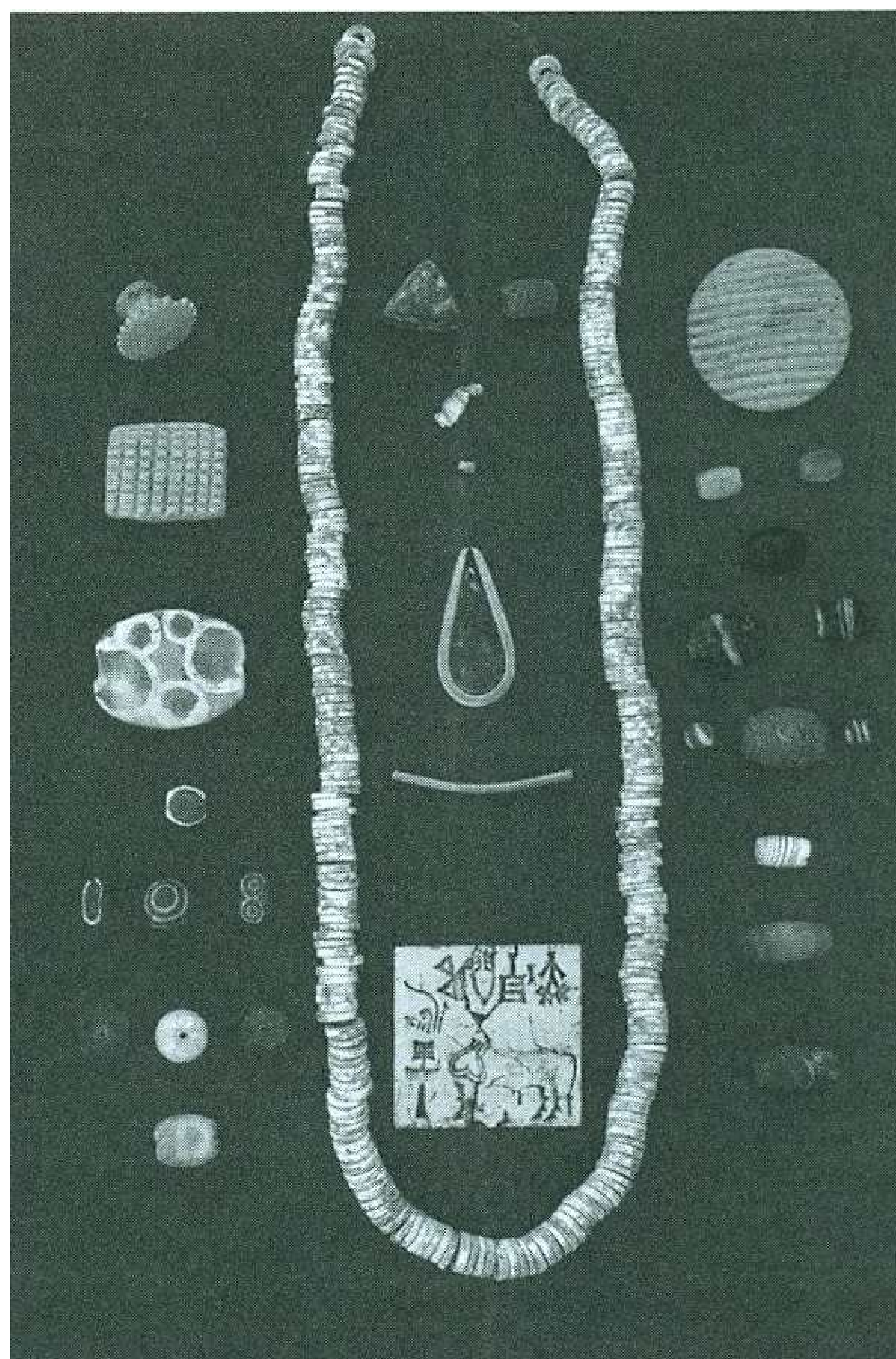
Diversification of Raw Materials: Harappan settlements are distributed over a broad geographical area conspicuously rich in raw materials and diverse ecological zones, including mountain, plain, and coast. Nested within these regions were sources of semi precious stones, highly valued metals, and animal and plant products. The differential distribution of raw materials provided opportunities for local exploitation and control of production. The raw materials exploited by the Harappans included stone (lapis lazuli, turquoise, chert, agate, quartz, basalt, ochre, and many other materials) and metal (gold, tin, and copper). Marine shell also was important

At some locations, raw materials were unprocessed and traded out to distant locations, while in others a limited number of production steps were completed before shipment. Preparation was in some cases geared to a specific final product, such as the banded chert cores that were transformed into weights at their Harappans exploited reaching out to areas in which desired materials were present, as demonstrated by the founding of Shortugai for exploiting lapis lazuli and other exotic raw materials. The sources of raw material in the Hardpan Civilization is a subject of hot debate and, hence, we have tried to discuss it in conjunction with individual crafts and technologies. Here, suffice to say that most of the raw materials the Harappan used in their crafts were largely local or available nearby in the Salt range and the hills of Baluchistan. destinations. Finally, the

diverse ecological zones,


A faience (a ‘created’ raw material) squirrel from Harappa

“Creating” Novel Raw Materials: Most crafts involved working with stone, metal, shell, fiber, and clay. With the exception of textiles, artisans approached them using either reductive or pyrotechnological techniques. Reductive technologies involved the chipping and reshaping of an object. Stone and shell are some examples of materials on which this technique was employed. Pyrotechnological techniques involved subjecting a raw material to heat. Clay and ores are typically worked in this manner. The Harappans also applied pyrotechnological meathods to stone-crushing, grinding, and firing the prepared "pastes" in kilns. They also created different versions of a single object. Figure below shows a collection of beads made from a number of different raw materials and various manufacturing techniques.This wide array of products suggests that objects were produced for a range of consumers .



Harappan ornaments produced from different materials and production technologies (HARP)

During the Urban period, the Harappans combined reductive and pyrotechnological techniques in other inventive ways. The production sequence for carnelian beads has been reconstructed from microscopic examination of archaeological examples and observation of modern artisans in India who produce similar beads. The sequence of production has been reconstructed in figure below (40). The production techniques demonstrate the extensive technical knowledge and skill required to produce the beads. Production begins with chipping the stone to form the desired shape along with

intermittent heating to make the raw material easier to modify. The final steps involve polishing, drilling, and reheating the completed beads in a reducing atmosphere, a procedure that draws iron oxide from the stone thereby deepening the red of its original color.

Artisans successfully implemented innovative technologies involving traditional reduction methods and pyrotechnical techniques less frequently applied to stone, essentially creating new materials or making the given material behave in a different way. These techniques produced easily manipulated media with which to produce an array of forms and products. For example, stone, clay, and other materials were ground and heated producing interesting color effects that produced "copies" of natural materials. H.M.L. Miller refers to the creation of new materials through pyrotechnology or chemical processes as "transformative crafts" (41). The enormous variety of stylistically similar objects produced from widely divergent technologies and resources raises questions about consumers, their choices, tastes, and access to these different products.

Although it could be argued that the transformations described are always the case when working with clay, a brief look at other Indus crafts reveals the same impulse to break down, re-create, and transform certain other materials. A good example of this manner of working is in the modification of steatite (talc) to produce disk-shaped beads. Disk beads are small, round, paper-thin ornaments. They are produced from steatite or talc and are first known from Mehrgarh in 5000 B.C. These early beads were produced using a reductive technique that involved cutting them from rod-like blanks; however, sometime around 4500-3800 B.C., the artisans at Mehrgarh began to glaze the disk beads with a coating of finely ground sand, lime, and clay to which ash or a substance with a mineral colorant was added, and firing them to about 1,000 degrees centigrade. In a later stage during the manufacturing history of disk bead production in the Urban period, extraordinarily thin (0.8-1.0 millimeter with 0.4 millimeter. inner holes) microdisk beads were perhaps produced from a "paste" (42)). It took three hundred very fine tiny beads such as the necklace at the center of the figure below, produced in this way to create one necklace (42).

Technological Homogeneity: A more or less homogenous material culture over a large geographic area, the provision of a uniform system of recording (the script) and the common system of weight and measurement, the provision of infrastructure such as a common metal and stone took kit, the lack of regional clusters in animal symbols on steatite seals, the common appearance of the unicorn symbol on seals, the establishment of settlements at specific loci for particular purposes (like craft centers or for the procurement of raw materials) and the evenness of large urban centers distributed over the map (Mohenjo-daro, Ganweriwala, and Harappa forming an equidistance triangle) is routinely offered as a proof for the existence of a centrally unified Harappan state. Notwithstanding whether there was a Harappan state or not, an overwhelming impression about the Harappan Civilization is of a sophisticated and highly complex society whose hallmark is cultural as well as technological uniformity, both throughout the several centuries during which the Harappan Civilization flourished, and over the vast area it occupied.

This uniformity of artifacts and the technology to make them remained intact over several centuries, experiencing only slow and imperceptible change. At one period, perhaps around 2500 B.C, one might have roamed from Kutch to northern Afghanistan via the Indus plains and found the familiar settlements of the Harappans all thriving contemporaneously wherein the pottery, bangles, seals, weights and measures, town planning, drains, graters, bath tubs, etc., looked so familiar that it gave the allusion of a static and non-changing society. The artifacts were duplicated so precisely wherever

Harappan settlement occurred that it is oftentimes difficult to speculate as to the spatial origin of any particular artifact or place or time period when it must have been fabricated.The uniformity of weights and measures, and the common features in agriculture, town planning, art, religion, script and seals, etc., are witness to this general impression.

The Allchins echo the conclusion of most researchers when they state that “ It is possible to typify each craft with a single set of examples drawn from one site alone” or, for example, that “a standard range of copper and bronze is recorded in site after site” (51). This impression of homogeneity results from two complementary factors: the similarity between artifacts at different sites and their predominantly plain form - in the words of Piggott: a competent dulness - which also gives an impression of primarily utilitarian concerns. The lack of decoration or particularizing features in the buildings is matched by the metalware, consisting mainly of sheets cut into simple shapes, or made up into container forms, and the chipped stone material dominated by parallel sided blades. This latter industry has been studied both at stone tools manufacturing “factory sites”, where actual working surfaces can be observed *in situ* and from recent work by Paulo Biagi, discussed in Volume II. This may be set against the rarity of secondary working in most of the artifact forms found in the Harappan sites.

It is possible that the uniformity of Harappan objects has been overemphasized, and similarities which exist may not necessarily reflect a conservative cultural framework, nor they may necessarily indicate a centralized type of political organization. It is possible that the traditional emphasis upon the very distinctive Harappan black-on-red pottery has prevented the definition of regional ceramic variations which manifest themselves among the nondecorative or non-black-on-red ceramics. It is possible also that the cultural rules governing the manufacture and distribution of the distinctive black -on-red decorated pottery were significantly different, and varied independently, from those which governed other types of pottery.

Almost all the relevant examples of diversity available to us are from the peripheries rather than from the core of the civilization. For instance, the cases of cultural differentiation in Kutch and Saurashtra, Kuli region, and Zhob and Quetta valleys can be quoted. Judging from their material culture, the people of Kutch and Saurashtra do seem to be different from those of the core areas of the Indus Civilization: this comes through as not just different kinds of pots and other artifacts, but in terms of subsistence, adaptation, and ways of life. Similarly, the Kulli people of South Baluchistan and those of Zhob and Quetta/Pishin Valley of northern Baluchistan stand out in contrast to the Harappans of the riverine plains. The seem not only to be somewhat different from the core area but also from each other. We also see some variations in material culture in the Indo-Gangetic Divide but these cultural remains, along with those of Kutch and Saurashtra, are of Late Harappan or even postHarappan period rather than of the Mature Harappan period. Looked from this venue, some degree of regional variation in ceramics does exist but these variations stem from being outside the time frame of the Harappan Civilization.

Thus, nonetheless, an underlying set of variables, both material and non-material, brings a sense of "oneness"to these remains, and there are some striking similarities among Harappan sites wherever they are found. This coherence is worthy of note because it is indicative of integrative forces that kept the norms of craft production together. As Wheeler observed: "Behind so vast a uniformity must lie an administrative anThus, notwithstanding the limited regional variation that can be discerned in some of the artifacts, the Harappan Civilization was quite uniform over a large span of time and

space, its technological base was rather slow to change, slow to the extent that ‘culturtal stagnation’ readily comes to one’s mind, its ceramics indeed reflected a picture of ’competent dullness’, its architecture only varying in the use of raw material dictated by its availability alone, and its social structure probably fossilized into a state of ‘eternal bliss’. This state of affairs - the expansive uniformity, the ‘competent dullness’, the extent ‘sameness’ over time - coupled with the apparent segregation of production areas for different products, bears upon the question of the social and political organization of the Harappan society and has fueled the debate on the political nature of the Indus cities.

The uniformity of cultural markers, such as the crafts of various kinds, has a strong bearing on organization of the industry, the procurement of raw material, and above all the mechanism for achieving such a uniformity over such a vast area. In this connection, the main analytical framework for Harappan material culture was established by Piggott(43), who chose to emphasize the uniformity in style and technology definable among such objects as ceramics, metal tools, seals and weights. According to Piggott such uniformity correlates with a ". . . a monotonous regularity of a highly organized community under some strong system of centralized government, controlling production and distribution and no doubt levying a system of tolls and customs throughout the territory under its rule" (43). Piggott felt that this uniformity reflected a basically conservative attitude toward culture change, one reflected in the Harappan culture to such a degree that he felt it had entered a stage of cultural stagnation. This interpretation of Harappan material culture is somewhat reflected in all subsequent summaries on the civilization and this was in the past at the root of influential and long-lasting interpretations of Harappan society. This model finds place in almost all textbook descriptions of the Indus Civilization.

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While a central control is universally admitted to, opinions differ as to the nature of such a central control, namely, was the above mentioned artifactual and technological uniformity was achieved by the centralization of production and distribution, or whether by some other means. State control has been favored for long but at present the prevalent opinion among the proponents of this model is that the Indus elite used the the control of raw materials used in the production of artifacts as a means of control and assured the uniformity of material culture. Some crafts could be regulated because the raw materials were difficult to obtain, others because the technology was complex.

The access to specific materials could have been carefully regulated by controlling trade or even direct control of the elite on the acquisition mechanisms. The walls and gateways would also have allowed for control of the export trade in finished commodities. This control could have been exercised both directly and indirectly through restrictions on the movement of raw materials, on technological knowledge, on labor, on distribution of finished goods, through taxation or outright prohibition. For example, by bringing partly processed raw material to the urban workshops, the rulers and merchants of the Indus Civilization could be able to control and standardize the production of specific items that were used in important rituals or to define status. Such crafts, as stoneware bangle-making, seal production and chert weight manufacture, may have been directly controlled in segregated workshops by the rulers, merchants or the state to limit access to these important symbols of power. Other crafts such as ceramic production, metallurgy and faience making were probably grouped together to share resources, labor or raw materials. In this way, it was possible to maintain the status quo through a control of economics and technology, rather than through overt military action.

The unity, or homogeneity, of the Indus Civilization is a controversial topic, in large part because it is one of the aspects of this ancient urban system that has been emphasized to the point of abuse and resulting misunderstanding. Indeed, I have taken serious exception to the notion that the whole of the Harappan Urban Phase was a kind of cultural "monolith" or an expression of some kind of innate South Asian conservatism.

Theabove-statedroleoftheHarappan state(s) or the merchant elite in maintaining the standardization and creating the apparent uniformity in artifacts may be a valid model but according to some archaeologists, their influence, manipulation, and control seem to be highly exaggerated. The regional uniformity in styles and forms, along with the combination of raw materials used, was not the monopoly of the Harappans alone, it already existed in the Early Harappan level in Sindh and Baluchistan or even earlier. In the Early Harappan period (3500-2600 BC), craft objects were locally made and varied both in style and in quality from region to region but they kept a degree of uniformity of style and material base. Of course, there was not yet a functioning state anywhere in the region. Furthermore, it is hard to see if the Harappan state or the merchant elite indeed had such overwhelming power over the Indus cities. Given the general level of technology and the apparent means of communication, the existence of such a state apparatus is difficult to visualize in any Bronze Age civilization. It is, therefore, possible that we are trying to read too much in the given uniformity and standardization of the Harappan artifacts.

Standardization of Crafts and Control of Production: An overwhelming impression about the Harappan Civilization is of a sophisticated and highly complex society whose hallmark is cultural as

well as technological uniformity, both throughout the several centuries during which the Harappan Civilization flourished, and over the vast area it occupied. It is also characterized by the ‘competent dullness’, or a lack of variety, of its crafts. The uniformity of its artifacts and the technology to make them remained intact over several centuries, experiencing only slow and imperceptible change. At one period, perhaps around 2500 B.C, one might have roamed from Kutch to northern Afghanistan via the Indus plains and found the familiar settlements of the Harappans all thriving contemporaneously wherein the pottery, bangles, seals, weights and measures, town planning, drains, graters, bath tubs, etc., looked so familiar that it gave the allusion of a static and non-changing society. The artifacts were duplicated so precisely wherever Harappan settlement occurred that it is oftentimes difficult to speculate as to the spatial origin of any particular artifact or place or time period when it must have been fabricated.The uniformity of weights and measures, and the common features in agriculture, town planning, art, religion, script and seals, etc., are witness to this general impression.

It is possible that the uniformity of Harappan objects has been overemphasized, and similarities which exist may not necessarily reflect a conservative cultural framework, nor they may necessarily indicate a centralized type of political organization. It is possible that the traditional emphasis upon the very distinctive Harappan black-on-red pottery has prevented the definition of regional ceramic variations which manifest themselves among the nondecorative or non-black-on-red ceramics. It is possible also that the cultural rules governing the manufacture and distribution of the distinctive black -on-red decorated pottery were significantly different, and varied independently, from those which governed other types of pottery.

In spite of all these possibilities, the fact remains that almost all the relevant examples of diversity available to us are from the peripheries rather than from the core of the civilization. For instance, the cases of cultural differentiation in Kutch and Saurashtra, Kuli region, and Zhob and Quetta valleys can be quoted. Judging from their material culture, the people of Kutch and Saurashtra do seem to be different from those of the core areas of the Indus Civilization: this comes through as not just different kinds of pots and other artifacts, but in terms of subsistence, adaptation, and ways of life. Similarly, the Kulli people of South Baluchistan and those of Zhob and Quetta/Pishin Valley of northern Baluchistan stand out in contrast to the Harappans of the riverine plains. The seem not only to be somewhat different from the core area but also from each other. We also see some variations in material culture in the Indo-Gangetic Divide but these cultural remains, along with those of Kutch and Saurashtra, are of Late Harappan or even postHarappan period rather than of the Mature Harappan period. Looked from this venue, some degree of regional variation in ceramics does exist but these variations stem from being outside the time frame of the Harappan Civilization.

Thus, notwithstanding the limited regional variation that can be discerned in some of the artifacts, the Harappan Civilization was quite uniform over a large span of time and space, its technological base was rather slow to change, slow to the extent that ‘culturtal stagnation’ readily comes to one’s mind, its ceramics indeed reflected a picture of ’competent dullness’, its architecture only varying in the use of raw material dictated by its availability alone, and its social structure probably fossilized into a state of ‘eternal bliss’. This state of affairs - the expansive uniformity, the ‘competent dullness’, the extent ‘sameness’ over time - coupled with the apparent segregation of production areas for different products, bears upon the question of the social and political organization of the Harappan society and has fueled the debate on the political nature of the Indus cities.

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It may be useful to quote Kenoyer's interesting observations (45) in this regard. He says: “Generally speaking, a wealth item can be defined as an archaeologically preserved object that reflects relatively high levels of indirect or direct economic control of resources, labour, or technological knowledge. Archaeologically preserved objects, such as ornaments, architecture, or tools reflect other forms of wealth that are not preserved, for example, grain, foodstuffs, livestock, or even agricultural land. The relative value of preserved objects can be calculated on the basis of four major assumptions: i. Rare or exotic raw materials have relatively more value than locally available raw materials;
ii. The overall wealth value of an object increases with the amount of labour required for production, where labour refers to time and/or number of artisans involved in production;
iii. Technological processes involving numerous stages, high degrees of skill and/or specialized technical knowledge increase the value of an object;
iv. Once an item has been accepted as a symbol of wealth within a society, elite will attempt to control the access to raw materials or knowledge in order to limit the production of specific wealth items and control their use.
Within this framework it is possible to rank various craft products used in a society and estimate the relative value of specific types of objects. This ranking can then be compared with the actual distribution of objects throughout the site or their frequency over time .... These four assumptions can be further correlated with major groups of specialized crafts that are defined by two sets of variables: the accessibility of raw materials and the complexity of the technology required to process raw material into specific objects. In the geographical context of the Indus valley the craft technologies used to create objects can be divided into four major groups: i) Crafts processing from locally available materials using relatively simple technologies include woodworking, basket making, simple weaving, terra cotta pottery production and house-building;
ii) Crafts using imported materials with relatively simple technologies include stone-shaping for

domestic purposes and chipped stone tool-making; iii) Crafts using local materials and complex technologies and production processes include stoneware bangle manufacture, elaborate painted and specialized pottery production, complex weaving and carpet making, inlaid woodwork production and construction of decorative architecture;
iv) Crafts using imported materials and highly complex technologies include agate bead manufacture, seal production, copper/bronze metalworking, stone carving, precious metalworking, shell working and faience manufacture.

The production and distribution of objects made by crafts in the last two categories are the most easily controlled. Consequently, these are the crafts that tend to be used in the creation of wealth items, a process that began with the earliest Neolithic communities and became modified with each subsequent phase of development (45).

The access to specific materials could have been carefully regulated by controlling trade or even direct control of the elite on the acquisition mechanisms. The walls and gateways would also have allowed for control of the export trade in finished commodities. This control could have been exercised both directly and indirectly through restrictions on the movement of raw materials, on technological knowledge, on labor, on distribution of finished goods, through taxation or outright prohibition. For example, by bringing partly processed raw material to the urban workshops, the rulers and merchants of the Indus Civilization could be able to control and standardize the production of specific items that were used in important rituals or to define status.

Such crafts, as stoneware bangle-making, seal production and chert weight manufacture, may have been directly controlled in segregated workshops by the rulers, merchants or the state to limit access to these important symbols of power. Other crafts such as ceramic production, metallurgy and faience making were probably grouped together to share resources, labor or raw materials. In this way, it was possible to maintain the status quo through a control of economics and technology, rather than through overt military action.

A current example for achieving standardization and economic control through the control of raw material is the carpet making industry in Pakistan. The merchant provides the artisans with the required raw material, i.e. The spun yarns, and owns the produced goods for distribution. The artisan, the user of the raw material, is thus dependent on the merchant; so does the dyer and the yarn spinner. Thus, not only an economic control is achieved but also the standardization is maintained. A similar example is the production of Banarsi fabrics in Karachi where standard color combinations and weaving motifs have been maintained for centuries along with the economic dependence of the artisans on the merchant elite.

The role of the state and the merchant elite may be there but at least some crafts, such as pottery and ornaments, could have been standardized through mechanisms other than state intervention or the dictates of the elite. For example, if a son or a daughter generally learns to make pottery from his or her mother, father, aunt or any other member of the family, painting styles and techniques are gradually standardized over several generations. These standardized technologies and decorative styles spread to new settlements as artisan families spread out to new markets or an apprentice leave the master’s workshop to open up his or her own shop in a new town. Indeed, such is the case even today in Pakistan. The black-on-red pottery, so common in Punjab, bears the same style, form, and decoration over a vast region and it has been so throughout centuries. The potter’s profession is

strictly hereditary in the region and their creations are surprisingly similar in form and decoration.

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Kenoyer (45) stresses that part of the difficulty in applying this 'model' lies in its lack of epistemological coherence, and in its abstraction from the reality of the Indo-Pakistani subcontinent. “While this model may seem quite straightforward, a theoretical jump has been made in assuming that segregation of specialized crafts can be attributed to centralized control and to socio-economic stratification. Ethnoarchaeological studies of specialized crafts indicate that there is no direct correlation between the craft activities and the control of production or socio-economic stratification” (45). These studies point to the inherent stability that is a natural outcome of the organization of certain craft production in South Asia. In these instances, such as those mentioned above, no central authority is needed to keep the tradition going for a long time and over alarge area. The knowledge of specific craft technologies is passed on from one generation to the next through kin networks and thus prone only to some long term variations.

Occupational Specialization and Organization of Craft Production: The great majority of the

Harappan population must have been primary producers: farmers, pastoralists, fishers, or huntergatherers. Many, however, probably also engaged in other occupations during the periods in the year when there was time to spare from subsistence activities. The bulk of agricultural work took place during the winter months, allowing farmers to engage in other activities during the summer months, including craft production. When *kharif* (summer) cultivation of millets and other crafts became important during the early second millennium, this may have changed. Marine fishing and shellfish collection also had seasonal periods of activity and slack periods in which other occupations could be followed, that of shellworking being particularly likely; river fishing was less seasonally dependent but could not be pursued during the annual inundation, at least in Sindh. Pastoralists and hunter-gatherers who moved between seasonal pastures and the localities where other resources were available at particular times of year also acted as carriers, moving raw materials and finished goods between producers and consumers. In addition hunter-gatherers, and perhaps pastoralists, could include in their seasonal round visits to places where other resources could be obtained, so they may have been largely responsible for mining gemstones and for quarrying flint.

While many artisans may have practiced their craft on a part-time basis, there were also full-time specialists. These resided in the towns and cities, and many of them were highly skilled individuals

producing special products, such as steatite seals, large storage jars, or the exceptionally long carnelian beads. Such skills required many years to perfect and were probably handed down from parent to child. Also resident in the urban settlements (though less visible archaeologically) were priests, officials, and other presumed members of the elite, as well as those who engaged in menial tasks such as cleaning drains. There may have been other fulltime specialists, particularly in the cities, such as builders to maintain the wells and civic amenities, though these tasks might alternatively have been undertaken by citizens as large. It seems likely that the latter was also the means used to bring together the large teams required to construct major projects such as the platforms on which many towns and cities were built.

Some craft activities, such as spinning and weaving, took place within the home, many Harappan artifacts were made by professional artisans at dedicated ‘factories’, such as at Chanhudaro where there is evidence for several craft manufacture concentrated at one location. Some goods were manufactured close to the source of the appropriate raw materials, either in dedicated settlements, such as the shellworking village of Nageshwar, or in towns that specialized in their production, such as Balakot where fishing and shellworking were the major occupations. Raw materials might also be transferred to an industrial center, where a variety of raw materials from the local region were worked, as at Lothal, which, reportedly, had ‘workshops’ making stone beads, objects of shell and ivory, and pottery as well as objects of copper from farther afield. Some raw materials were processed to reduce their bulk before being sent on to towns, where they were made into finished goods: For example, flint quarried in the Rohri Hills was knapped in situ to make flakes and blades that were turned into tools in the towns and cities. Major settlements were centers with many industries, using raw or partially processed materials sent on from their source areas, as well as manufacturing artificial materials such as faience, Chanhu-daro being one example. Here skilled artisans made specialized products such as seals, as well as ordinary objects like metal tools. Data from surveys in Cholistan suggest that many towns were surrounded by satellite industrial settlements; this may have been a more widespread pattern.

The distribution of craft-working debris, such as dumps of overfired pottery and vitrified kiln linings, discarded pieces of raw materials, and broken manufacturing tools, has been used to gain an insight into the organization of craft production within settlements. Small workshops for light industry were scattered throughout the city of Mohenjo-daro, each probably operated by a single family. Different crafts were often located side by side, rather than in quarters dedicated to particular crafts. But there were also a few larger-scale operations: factories rather than domestic workshops. It is likely that more of these were located in the city's suburbs, particularly those where the production process produced noxious fumes or other industrial pollution. This was true of the 4-hectare industrial site discovered east of the Lower Town Mohenjo-daro, where shell processing and probably copper working took place. At Harappa the HARP team located an area in mound E that was devoted throughout the city's life to the manufacture of particular types of pottery. Other industrial areas and individual workshops were found in other parts of the city.

In Late Harappan, there is evidence of craft organization in the form of trade guilds. In this connection,the situation at Gola Dhoro (Gujarat) is revealing. There, the material for bead-making was stored in the citadel, although the beads were manufactured in the unwalled settlement. This seems to imply official supervision of the issuing of raw materials and control over production.This ‘official supervision‘ could have been a prominent merchant household rather than a stately function. More likely, it could have been a function of the trade guild.

Distribution of Craft Activities: Distribution of craft activities in the Harappan cities and towns is a diffused subject. Looking at the excavated Harappan sites, it appears that there were both individual workshops operated by single individuals or families and a few larger industrial complexes (factories). These might be dispersed within the residential areas or clustered together. Craft activities were generally concentrated in the Lower Towns but some industries were also conducted in the citadels. For example, in the small town of Gola Dhoro in Gujarat, shellworking and faience manufacture took place in the citadel, while beadmaking was mainly undertaken in the residential area, though the raw material was stored in the citadel. In cities and some smaller towns, specialists in a number of different crafts might work in adjacent workshops. Where the same skills or equipment were required for several different crafts, these might take place in a single workshop. Pottery firing and metalworking tended to be conducted in discrete areas, separate from other craft activities. Some of the industry, such as the manufacture of baked bricks, was located in the suburbs or even away from the inhabited area. There are also examples of some sites, such as Chanhu-daro, which were dedicated to crafts only. These 'industrial centers' generally concentrated on a limited range of artifacts. Chanhudaro may have been an exception, producing some special products, such as long carnelian beads, as well as more ordinary goods. The range of craft activities for which there is evidence included copper casting, beadmaking, stone weight manufacture, bone and ivory working, shellworking, faience manufacture, and perhaps pottery production.

Many of the craft activities were highly specialized. Some were concerned with a particular stage of manufacture, others produced a limited range of artifacts, such as two pottery-making sites in the Moneer area at Mohenjo-daro where pointedbased goblets were mass-produced. The sequence of activities in a group of houses in this area shows that there was no long-term correlation between a single industry and a particular location at Mohenjodaro: A number of steatite workshops were succeeded by one larger complex manufacturing stoneware bangles, which in turn was replaced by stoneworking and finally by pottery manufacture. At Harappa, detailed investigations of workshop areas have shown that one in the northwest of mound E was devoted throughout the life of the city to the manufacture of particular types of pottery. Crafts were practiced in various parts of mounds E and ET, their products including shell objects, agate beads, flint tools, weights, seals, metal artifacts, and pottery. Wheeler excavated a large concentration of furnaces, probably for metalworking, north of the citadel in mound F; these belonged to the city's latest occupation.

Blackman and Vidale (46) propose that some commodities may have been manufactured at only one Mature Harappan site and that others were the product of quite specific, if not exclusive, manufacture. The first point is illustrated at Chanhu-daro: this may have been the only place where the very large "longbarrel" carnelian beads were made, since not one roughout or blank of this bead type has been found at either Mohenjo-daro or Harappa. The palaeo-technological analysis of the shell industries of Mohenjo-daro by Kenoyer shows that the manufacture of ladles from murex shells is definitely under-represented in that site, while this activity represents one of the most important industries at the coastal sites and in the workshops of Chanhu-daro. The study of these broad patterns in the structure of Indus technology is a growing field, one within which there is much more to be learned about the organization of Harappan life.

Workshops in the cities suggest that specialization was common; for example, the pottery area in the northwest of Harappa mound E made only certain types of ceramics. On the other hand, a single workshop might undertake several related activities, such as beadmaking and seal manufacture. Balakot near the mouth of the Indus was the center for processing shells obtained from the nearby

coastal waters. Different parts of such sites were devoted to different stages in the production cycle. Separate parts of the process may have been the responsibility of different specialists. It is apparent from various studies that some objects were made exclusively for the larger urban centers such as Harappa and Mohenjo-daro. For example, hollowed shell libation vessels, stonewae bangles and faience vessels are found at only the major urban centers. Other objects, such as the black and red painted pottery and steatite seals are spread throughout the entire region of the Indus as well as in the adjacent regions of Afghanistan and the Indian borderlands.

The organization of craft production was probably varied , and included small and large scale kin related production and more centrally controlled production of high status items for local or long distance distribution (38). The general patterns of craft production and trade that are documented at Mohenjo-daro and other Indus cities indicate the presence of different organizational structures. Some crafts were apparently structured on the basis of kin networks and were decentralized in terms of state control. Others may have involved longdistance kin networks and alliances that could be decentralized in terms of direct political control, but required some centralized support to maintain long distance trade relations.

Studies have also shown that some crafts, such as seal manufacturing, stoneware bangle production and carnelian bead making, may have been segregated to control production of status items. On the other hand, some crafts such a metal working or pottery making may have been segregated for more basic reasons related to access to materials and skilled labor. Similarly, the standardization of items such as weights and seals may be attributed to centralized control, while other object, such as pottery and ornaments, may have been standardized by mechanisms that reflect a shared ideology and aesthetics. For example, kin-related learning process or the spread of kin-related artisans to different settlements can result in high standardization (35). Segregation and integration of craft producing facilities in major Harappan cities is a hot topic of ongoing debate. The evidence is conflicting, as is evident from the above. Kenoyer and associates argue: “What we perceive as material evidence for urban segregation may reflect different phenomena. On a purely archaeological ground, the selective location of large amounts of industrial debris may be due to the growth of large dumps within the settlements, having little relationship with the place where manufacture took place. So, particularly during surface survey, large concentrations of craft residues do not necessarily indicate workshops and craft quarters. The permanence of a large group of potters in the same area for a short time might produce a large amount of waste abandoned on the spot, while a well organized potters quarter might have required efficient forms of maintenance of the space, with the consequent growth of dumps far from the workshops. Furthermore, as observed, for example at Mohenjo-daro and Harappa large amounts of industrial residues were removed and displaced all over for architectural purposes. Only a careful evaluation of the stratigraphy below the surface spreads of industrial refuse can provide safer grounds for interpretation” (3).

Notwithstanding these arguments, segregation may reflect the need of craft groups to live in close proximity for exchanging resources and services, or for obeying rules of behavior shared by the whole society; or the intentional organization of the craft groups into hierarchic segments by a central urban authority. Kenoyer (45) cites as an example contemporary pottery production in Pakistan, which is decentralized, being organized along kin-based networks and depending upon reciprocal obligation and exchange transactions between potters and non-potters. Part of the pottery so produced and distributed is fairly standardized in shape and decoration, as it must conform to the aesthetic standards of large, loosely spread kin or ethnic groups. In many contemporary urban

contexts pottery making also appears to be spatially segregated but this localization of production does not reflect any active purposeful interference from state. In spite of the limited amount of research so far accomplished, the first models derived from ethnoarchaeology can already be considered better candidates for explaining some forms of Harappan craft organization than old models plainly derived from Egypt or Mesopotamia.

Professional specialization in South Asia is far from being a 'neutral' field of inquiry since the question of caste system immediately comes to fore. Instead of concentrating on the issue of production and distribution of crafts, the question becomes: was there a caste system or was it not? Segregation of production areas (and, of course, the labor) is generally equated with the presence of castes.

The excavations and intensive surface survey at Mohenjo-daro inform us that nonpolluting industries were located within the city. These industries were involved in the manufacture of seals, beads and shell ornaments, and luxury and other prestige items probably consumed within the city. There is a "suburban" shell-working area, approximately 500 meters northeast of the Lower Town. During the Late Period at Mohenjo-daro, there seems to have been two patterns of pottery production in the city. There was a kind of potter's district, as well as individual household potters. We do not know enough about the earlier occupations at Mohenjo-daro, and whether this pattern was present then.

There are indications at Harappa for copper smelting/melting debris and slag, as well as pottery firing debris, to be separate from debris from other crafts. On the other hand, lapidary activities (semiprecious stone, chert, steatite, and may be ground stone) are usually found together, often in association with shell working. If this is a valid observation, one can see differences in the organization of pyrotechnological activities, as contrasted to the extractive-reductive crafts. This pattern is evident at Harappa as well as at Mohemjodaro. Sometimes the forming stages of such pyrotechnological crafts as pottery, faience, and copper were undertaken near their firing places. For example, potteryforming tools were found during the excavation of a pottery kiln on the northwest corner of Mound E at Harappa. There is also evidence that the firing of steatite took place in the vicinity of its forming stages, as represented by the steatite- coated clay containers found together with talc/steatite and other lithic debris in the general debris levels of the southwest corner of Mound ET.

The distribution of craft-working debris, such as dumps of overfired pottery and vitrified kiln linings, discarded pieces of raw materials, and broken manufacturing tools, provides important and interesting insights into the organization of Indus craft production. The distribution of such material in the great city of Mohenjo-daro has recently been intensively mapped by an international team working under the auspices of Aachen Technical University and the Italian Oriental Institute. This has revealed that small workshops were scattered throughout the city, each probably operated by a single family. Different crafts were often located side by side, rather than in quarters dedicated to particular crafts. But there were also a few larger scale operations - factories rather than domestic workshops. However, as the known and excavated portion of Mohenjodaro is only the center of a far larger city, it could well be that this pattern is not typical and that in the suburbs there were far more craft production areas on the factory scale.

Much of the craft activity that took place may be undetected since regular or periodic cleaning would have removed the debris from workshops to dump areas, often at a distance. Many crafts using

perishable materials, such as leather working, would have left no trace, except for tools whose functions are often not diagnostic. In other cases, only fixed equipment, such as a kiln, may survive to reveal the presence of craft activity in domestic workshops. In contrast, huge amounts of debris accumulated in areas of intense craft activity, making these easier to identify. Negative evidence does not preclude the presence of certain activities, although it can be suggestive; for example, the failure to detect metal smelting in the Harappan towns and cities suggests that this took place near the ore sources. Despite all these problems, however, intensive investigation at Mohenjo-daro and Harappa and studies of several other settlements have revealed much about the distribution of Harappan craft production.

Legacy of the Harappan Craft Tradition: Mackay developed a rigorous study of traditional crafts in Pakistan in order to better interpret the archaeological materials that he was excavating. Today, we may refer to this as an ethnoarchaeological approach. With the assistance of his informants, he made careful observations of the ways in which traditional crafts were practiced to determine what types of patterns would be observable on the archaeological materials. Using these observations he was able to make quite reliable interpretations of the objects discovered at Mohenjo-daro and Chanhu-daro. Of the wide range of the traditional crafts that he observed, he published special accounts of carnelian etching or bleaching processes at Sehwan Sharif and pottery manufacture in Sindh (48). Unfortunately, many of his contemporaries and successors did not follow his example. Instead of making careful technological studies, we see many examples of simple analogies being drawn between modern and ancient crafts (47). The result has been a confusing picture of the archaeological record and even more confusing range of interpretations regarding the craft gradations of the Indus Civilization (48).

On the other hand, the proliferation of the socalled 'ethnoarchaeological' studies in recent years has resulted in an equally confusing interpretation of the Indus legacy in moder-day India. There is no need to repeat the numerous cautionary tales about the indiscriminate use of analogies. They abound in the Western journals, but we must recognize that even though South Asia has very long cultural continuities in technology, as well as in social and ritual organizations, we need to define strong theoretical and methodological framework for each and every study that is undertaken. Ethnoarchaeology is a broad field of inquiry that encompasses all aspects of human adaptation, from the selection of raw materials to the ideological basis for specific symbols. Nevertheless, it is important to emphasize that not all ethnographic observations of traditional or modern crafts are ethnoarchaeological studies. To be effective, ethnoarchaeological research must be undertaken in a rigorous and well defined manner to address specific aspects of material culture patterning that is preserved archaeologically. Also, it is not sufficient to say that there are similarities or differences, but it is necessary to define why they are significant and how they can be used to make more reliable archaeological interpretations.

Many of the traditional crafts in present-day Pakistan retain some of the characteristic features of the earlier Indus crafts. Some of these features are due to the fact that the same basic raw materials are still available and that the most efficient techniques of For example, production of unglazed terracotta, involves basically the same technology as that used by the Indus artisans. Because of the fact that clay and fuel is available throughout the alluvial plains and plateaus, this craft is carried out in every village and town. Much of the marketing of the ceramics is carried out on the basis of reciprocal exchange between the potters and the agriculturists, just like the presumed method of exchange in the Harappan times. The state does not tax such a transaction, nor does it control the local

trade. There is no attempt for standardization from any outside agency but surprisingly all over the country (and the neighboring Afghanistan) the products are uniform in form, size, and decoration. This uniformity in manufacturing tradition comes from the accepted norm that the public has been familiar with through generation; it does not feel a need for a change. Kenoyer (48) emphasizes that these crafts do not represent a stagnation in technology or science, but rather an optimum method of production using local materials and fuels. This position is hard to justify since there is nothing ‘optimum’ to stick to the raw materials and technology that was developed over 6,000 years ago. It is nothing but cultural stagnation unparalleled in human history.

Secondly, and probably more importantly, the art of pottery manufacture runs in particular families and clans, generation after generation. It is rare that a non-member of the clan would get into this profession although a potter may quit potting and move to another economic activity, such as pastoralism. If a potter moves from one place to another, he generally settles with his kin and joins the clan to make the same pot which he was making at his earlier location. To boost the conformity, the members of his kin-folks are already making the same pot, using the same technique which the potter left behind. Thus, an extraordinary similarity throughout the region is assured. Looking at this mechanism, one feels compelled to conclude that even in the Harappan times no state coercion was necessary and that the craft uniformity stemmed from the close-knit potter’s community, whose members copied each other and ensured uniformity of form, size, and color, unintentionally.

The same mechanism is at work in several other crafts. A case in point is the fabrication of jewelry. In spite of the wide-spread exposure to the world, the jewelers of Lahore or Multan or Peshawar still continue to use the same designs and use more or less the same techniques as the jewelers of manufacturing remain unchanged. pottery manufacture, specially the yore did. This is, again, because of the kin based activity. Another example of unintentional uniformity of product and technology is seen in the weaving of certain silk fabrics, locally known as *Banarsi*. No matter where the weaver is located, he follows the same tradition of motifs and colors as that utilized by his kin-group in Karachi. Again, a surprising uniformity of product and weaving technique is assured without any supervision or guidance from the outside.

Faience manufacture is no longer practiced today as it was in the past, but the same basic technology has been incorporated into the production of glazes that are used on ceramic vessels or on decorative tiles. At the present time, and even historically, glazed ceramics and tiles have been produced in only a few specialized workshops, for example Hala and Multan. The knowledge of glaze manufacture and the careful control of firing temperatures has traditionally been kept secret, with different workshops specializing in specific colors and techniques. Historically, glazed ceramic production was patronized by the elites and indirectly controlled by the manufacturing families.

Another aspect of the Indus craftsmanship should also be noted. Indus craft somehow puts unnecessary details in making a given object, the details which do not enhance the aesthetics of the object. A pertinent example is the manufacture of etched carnelian beads. This tendency for details persisted in the regional arts and crafts during the historic times; and some of it still plagues the arts and crafts of modern Pakistan, Afghanistan, and India.

Summary: Summing up, we may say that the technical level achieved by the Harappans over such a vast area is probably unique in the ancient world, and that Harappan technology deserves Childe's acclaim as 'technically the peer of the rest'. The ‘Indus Technological Virtuosity’ is firmly rooted in

the ancient world of the Early settlements of Baluchistan in the 7th millennium BC and the sophistication of the Early Indus phase in the fourth millennium BC. Highly developed metallurgy is quite evident, although the metal objects are not at par with those of Mesopotamia. Pottery and the decoration on it are far superior to anywhere. Terracotta objects and the varied techniques of their firing is also without any parallel. Stone objects, beyond some types of tools, are not that abundant, that is if we do not count the stone beads. Here the Indus artisans are without any peers.

The Indus technology as practiced in the Harappan phase, or even earlier, seems to be quite resourceful in terms of the use of the available raw materials, it is utilitarian in nature rather than serving the fine art. It is in the service of material wellbeing that the Harappan technology shines most brightly; the efficient water management, including the sewage system in the cities and towns; town planning, brick-lined wells, and architecture; the production of quality-controlled raw materials for building houses (fired– and un-fired bricks, shaped stone blocks, ring-stones, etc); the knowledge of chemistry in the service of glazes, pigments, finishing of stone beads and seals; and above all the mass production of bricks and pottery. We do not know anything about the Harappan textiles and basketry but judging from their predecessors, the Early Indus peoples in Sind and Baluchistan, the Harappans must have excelled in this technology also.

Harappan artisans developed elegant objects out of bronze, gold and silver, terracotta, glazed ceramics and semi-precious stones. Many of the exquisite objects are extremely small, often made from raw materials that were transformed through complex techniques of manufacture. Their craftsmanship demonstrated a total control of the medium and ability to capture the essence of a symbol or figure with a few delicate strokes. The small scale of Indus objects suggests that craftsmanship and technical qualities were more desirable than gross monumentality. The legacy of the Indus arts and crafts is still seen reflected in the modern cities and villages ofIndia and Pakistan.

As has been demonstrated in the above sections, studies of Harappan crafts are not only keeping pace with the fast transformation of the archaeological discipline all over the world, but they are in fact defining significant variables for the discussion of crafts in the earliest urban societies .. However it should be noted that there are many other technologies that are being studied but could not be covered in this paper. The production of plasters and mortar for extensive architecture at Harappan sites is an area of study that has caught much attention. Another area of obvious interest is carving and transport of massive ringstones and architectural components discovered at Mohenjo Daro, Harappa and Dholavira. Specific technologies to produce tools and weapons for fishing and hunting, shipping and transport are all sadly undelTepresented in the literature and need further work.

As scholars continue to unravel the complex features of Harappan technology we will be able to define the role of these industries in the rise and maintenance of urban centres and compare these patterns with those found in Western Asia. While in the past, the Indus region was thought to have been at the receiving end of technological diffusion from the west, it is becoming more and more apparent that this is an inadequate model. CUlTent investigations of information exchange and control of knowledge are gradually breaking away from the bonds of directionality that dominated the diffusion model in the past. The comparison of faience manufacture, lapidary, metal processing techniques, etc., between culturally very distinct regions known to have communicated with each other to some degree will add considerably to our knowledge. Furthermore, the comparison of production techniques and use of finished objects within the Indus Tradition itself will be extremely important. Through such approaches we will begin more meaningful discussions of independent and derived

invention, shared and restricted knowledge, and the adoption of technological style, including the deliberate choice of methodologies as a component of ethnic identity.

Impressive as the Indus technology and the artifacts have been, its limitations should not be overlooked. The majority of the products are unimaginative and unadventurous, in some ways reminiscent of the products of the Roman provinces, suggesting that they were practical men. On the other hand, we see an immense amount of work devoted to the production of finely drilled and shaped beads from semi-precious hard stones. Indeed, we may not be altogether wrong if we detect in this aspect of their way of life the roots of the cultural style which distinguishes the Indian and Pakistani cities of the historic period from others in the region.

By looking closely at all aspects of Indus crafts, we can gain a fuller understanding of the people who made and used these otherwise mute objects. The urban centers were a totally new context for interaction and display, and the Indus artisans met the challenge by creating a wide variety of utilitarian and ornamental objects. Each different craft contributed in some way to the overall structure of the Indus cities, by linking some communities and distinguishing others. Complex technologies and rare materials allowed the creation of valuable objects that served to differentiate the ruling elites from the common people. At the same time, symbols of Indus religion and culture were incorporated into pottery, ornaments and everyday tools in a way that helped to unite people within the urban centers and link them with distant rural communities.

It is clear that the Indus Civilization, like other societies to which the term ‘civilization’ has been applied, was marked by a very high degree of occupational specialization, in which some individuals not only devoted their lives to the practice of a particular craft but even probably confined their activities to a particular branch of that craft. Some of the objects they produced were very specialized products indeed, like the carnelian necklaces that took a craftsman a whole year or more to make. Clearly a society that supported this degree of specialization must have been highly organized and stratified.

We may say that the technical level achieved over so great an area as is demonstrated in the Harappan Civilization, is probably unique in the ancient world, and that Harappan technology deserves Childe's acclaim as 'technically the peer of the rest' (that is, of Egypt and Babylonia). However, its limitations should not be overlooked. The majority of the products are unimaginative and unadventurous, in some ways reminiscent of the products of the Roman provinces, but also suggesting either that the people of Mohenjo-daro and Harappa had their eyes on things beyond this world, or more probably that they gave their attention to less permanent crafts such as textiles. Indeed, we may not be altogether wrong if we detect in this aspect of their way of life the roots of the cultural style which distinguishes the Indus cities from the historic period.

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Chapter 15

Indus Seals

Harappan Seals, Tablets, and Amulets

Chapter 16 Indus Seals! we find a pair of Indus Seals carved ivory seals at Rehman Dheri (Durrani, the excavator, calls them pendants) of Kot Diji culture of the Early Indus period and brid' type of seals, especially those found on theboth of them have animal motifs. The Harappanisland of Bahrain (ancient Dilmun), which could be

sometimes call amulets, are extraordinarily beautiful seals, which its artisans of interest to us because of their close affinity to the

tradition of seal designs seems towell-known artifacts throughhave itsfashioned from steatite, and occasionally of silver, seals of the Indus Valley. They are round seals, in beginning here. out the Indus and contempofaience, copper, and calcite. About 50 percent ofstead of the square shape of the Indus, but surpris



rary cultures around the Per ingly carry the Indus script.



Seal Types, Raw Material and

sian Gulf, southern Mesopo
Harappan seals have been found at Mohenjodaro
and when combined with the number from Finds of the Harappan seals and tablets ocA copper tablet with raised inscrip
tamia and Iran. Seals are also cur generally along main streets, in certain work

Manufacturing Technology

Bronze Age Harappa, the percentage goes up to almost 90tion from Harappa (after Kenoyer)
percent. The seals from other listed sites such as Chanhu-daro, Allahdino, Lothal, shops, and in houses in certain areas, but most of
cultures of Central Asia (1). These artifacts come in them have been found in settlement rubbish. Very
Kalibangan, etc are much smaller. There is virtually no evidence of any regional
different shapes and form but the Harappan Civilioccasionally, a seal has been recovered from a

There are several different types of the Harappan place of safety, for example, buried beneath a
form, or motif, over the long time period. The study of Indus seals is of interest as they house floor. Far more common are broken seals seals. They differ not only in their thematic scope

fashioned from steatite, and occasionally of silver, that had been discarded. When impressed on a faience,

but also in the material of manufacture, size, and

but also reveal the various aspects of religious and social life of the Harappan society. It pliable surface such as clay, an image was pre

shape. The most commonly known Indus seals are is of particular interest for another reason: the seals carry the bulk of the writing thatserved. This image is referred to as a sealing. The

survives from the Indus civilization. throughout the Indus Valley, as there is virtually no discovery of sealings at a few sites shows that the

of square shape, made of steatite. These seals are

evidence of any regional variation in seal type or seals were used to stamp clay attached to packag

not very large; the sides generally range from 1.9 to ing on goods or for sealing of jars. Almost all known

of style, form, or motif over the long time period durthe seals themselves are far more numerous, over 1,200 of them being found at sealings come from the warehouse at Lothal where

3.2 centimeters, and have a holed boss on the back

Mohenjodaro alone! The customers of seal-cutters were undoubtedly the elite of the they were fortuitously preserved by a fire; of the

to enable it to be carried by a string. The largesttotal approximately 130 to 140 sealings known in tool of trade. Some of these carved or molded objects probably served as amulets in the the Indus, 93 have been found at Lothal. This sugsquare seal of Mohrenjodaro is a little more than gests that sealings were in fact far more commonsame fashion as *taweez* or *Imam-Zamin* do in modern Pakistan. than the meager number of finds would indicate.6.35 cm square. The more usual ones are around



The square/rectangular type forms the diagnostic type of the Indus seal. Cylindrical While some seals show signs of considerable wear,2.54 cm. square and examples of 1.27 cm square Broken steatite mold carved into a

seals are characteristic of the Mesopotamian and Persian world whereas the round type others were almost pristine. This would mean that unique fan-shape. This mold was

also are known. There are several other types of these seals were probably used for some other pur

is diagnostic of the Gulf area. A few cylindrical and round seals have been found atpose than sealing of jars and stamping of goods.
Harappan sites and their presence indicates a cultural contact of the Indus Valley withprobably used to make a faience the Gulf and Mesopotamia. Similarly, a few square seals have been recovered from sites
Of special interest are the very small seals or
tablets found in the very earlytablet depicted below and found on atin Mesopotamia and the Gulf and these confirm the presence of the Harappans or their occupations an eroded slope nearby at Harappa. agents in those areas.



The Pre-Harappan **A typical steatite Indus seal** **Origins of the Indus Seal**

The seals, for which the Indus
ing which the civilization flourished.



Civilization is so well-known, was The study of Indus seals and tablets is of in
terest as they not only reveal the artistic and tech
not an invention of the Harappans. A patterned bead type seal and its impression from nological prowess of the artisans who shaped them

The carving of seals from steatite
but also reveal the various aspects of religious and
seems to be rather common in the

the early settlement period at Mehrgarh, sixth millen
nium BC, which Jarrige interprets as a cylindrical
social life of the Harappan society. It is of particular seal akin to later Mesopotamian seal
interest for another reason: these objects carry the
bulk of the writing that survives from the Indus Civilization. Nearly all come from Mohenjo-daro or Harappa, but some are also known from other
towns and cities, including far-off Shortugai, and
from some towns and villages in Kutch and Saurashtra. A few have also been found in the IndoGangetic Divide as well as abroad, in Sumerian

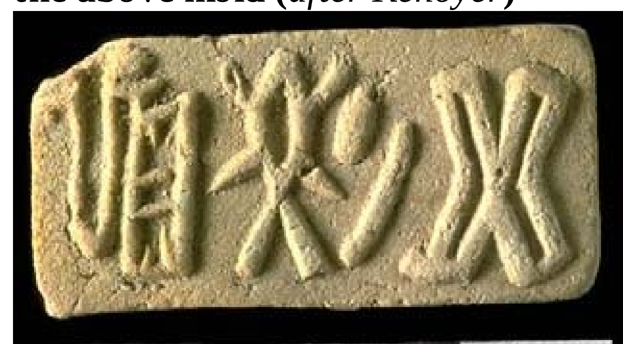
cities, Susa, and the Gulf. There are also some 'hy



331



A molded terracotta tablet from Harappa, most likely using the above mold (*after Kenoyer*)



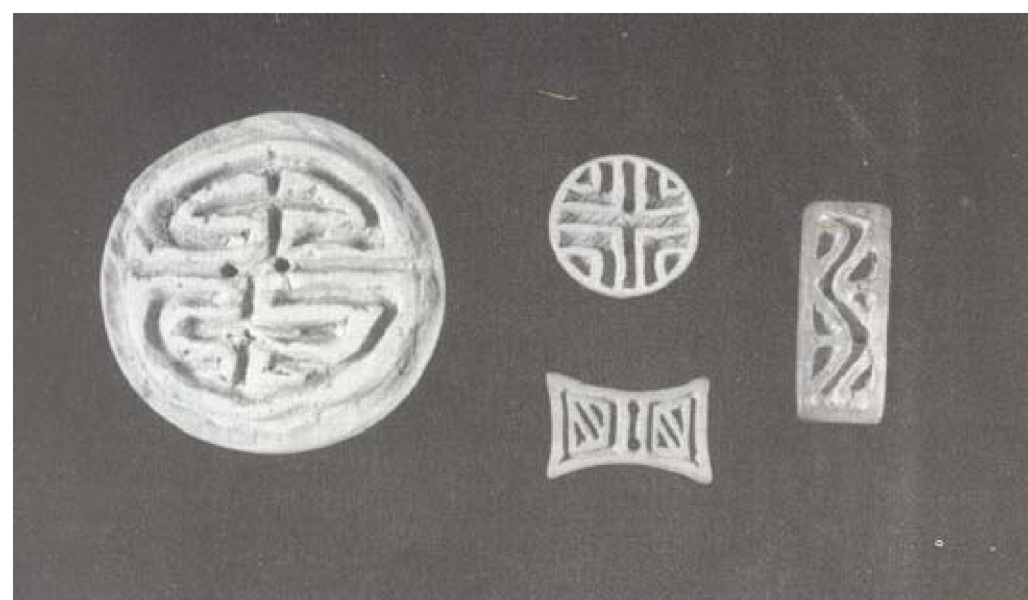
Indus Seals!

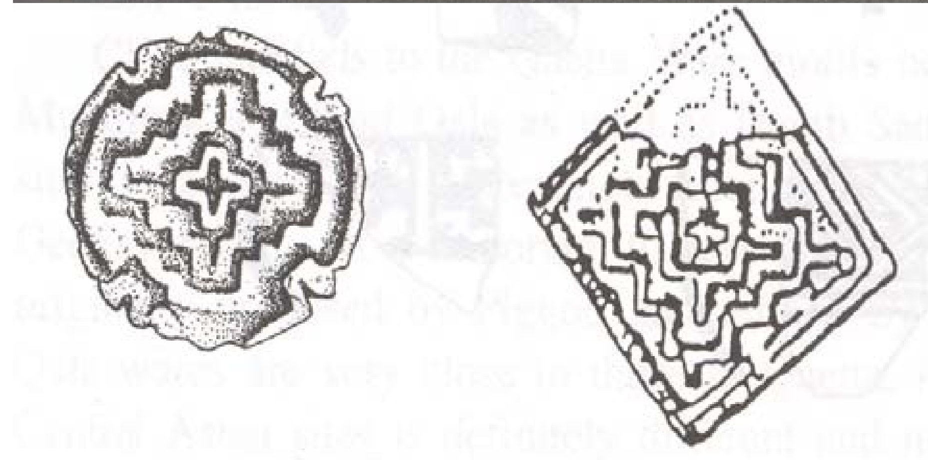
Harappa. The raw material is generally faience but examples of terracetta and copper are also known. Here, in contrast to the common steatite seals, the inscription and the animal motif is in the 'positive', which means that they were not meant for sealing. Unlike seals, almost all of which are unique, the incised steatite tablets are copies of the same signs and/or motifs and made from the same mold (10). In

addition to these miniature seals or tablets, there
Early Indus period and examples are available from even earlier times. Jarrige found a A geometric seal from

 cylindrical terracotta bead in one of the compartmented buildings of

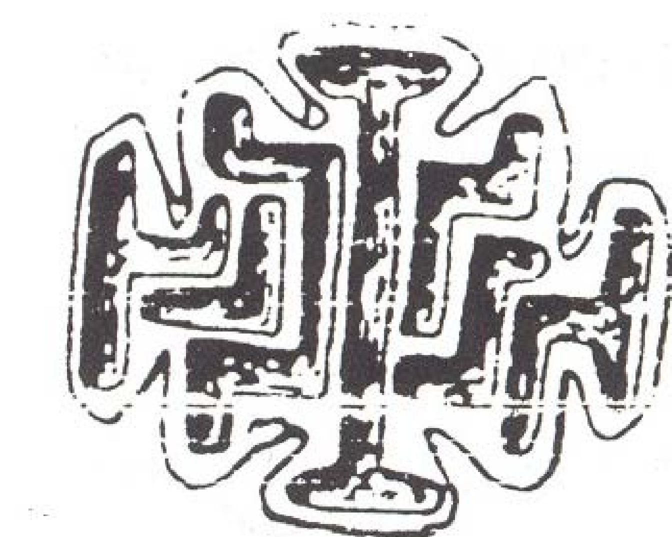
Mehrgarh Period IIBaluchistan found in associa(sixth millennium BC). When rolled out, this bead produced an impression much like Geometric button seals from Mehrgarh, c. 3300 to 2800 BCof the Early Indus period





that of a cylinder seal. The motif is regular and portrays Similar seals are also known in

Indus Seals
!
western Iran in an early context and the bead from Mehrgarh could be



considered as an early prototype of
Indus period and examples are available from even earlier times. Jarrige found a

are some copper and terracotta chips that are only Early

cylindrical terracotta bead in one of the compartmented buildings of Mehrgarh Period II Early Indus period and examples are available from even earlier times. Jarrige found a cylindrical terracotta bead in one of the compartmented buildings of Mehrgarh Period II

(sixth millennium BC). When rolled out, this bead produced an impression much like

Early Indus period and examples are available from even earlier times. Jarrige found a

Geometric button seals from Mehrgarh, c. 3300 to

cylindrical terracotta bead in one of the compartmented buildings of Mehrgarh Period II

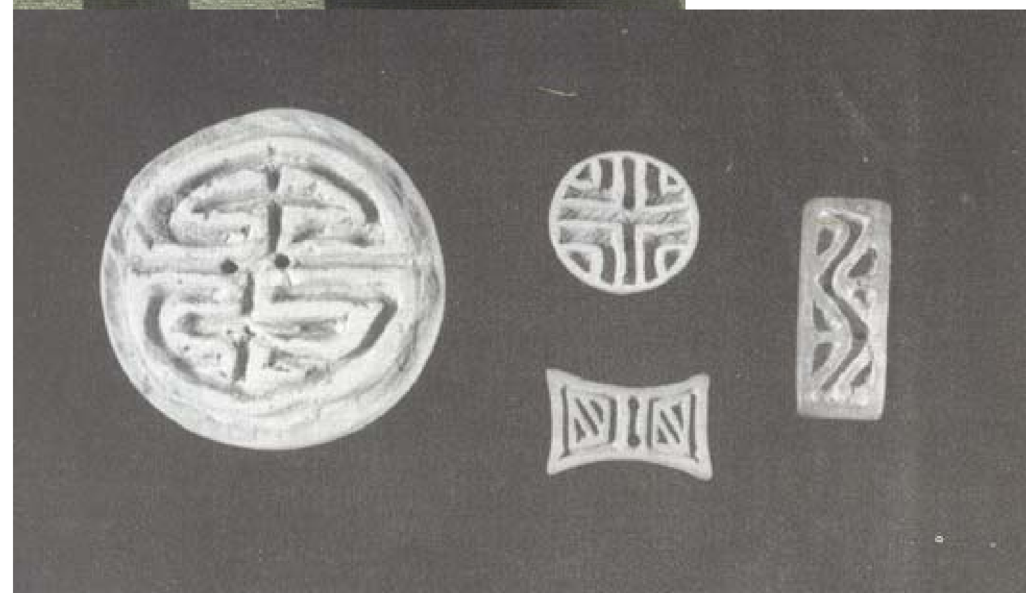
A geometric seal from Harappa (left) and a similar mo(sixth millennium BC). When rolled out, this bead produced an impression much like

the cylinder seal that later became

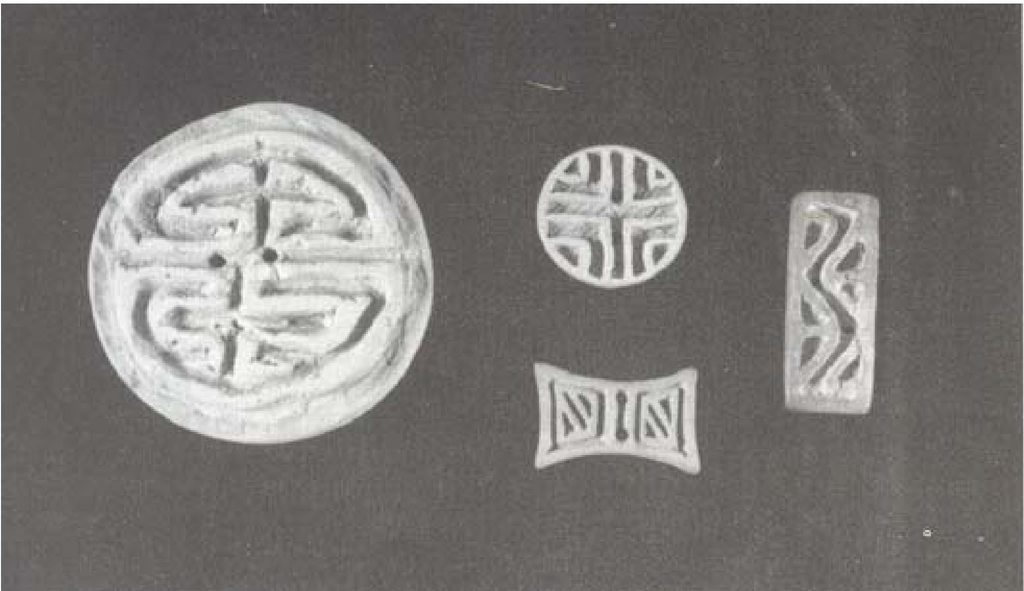
popular in Mesopotamia. Baluchistan found in association with Quetta Ware culture

of the Early Indus period



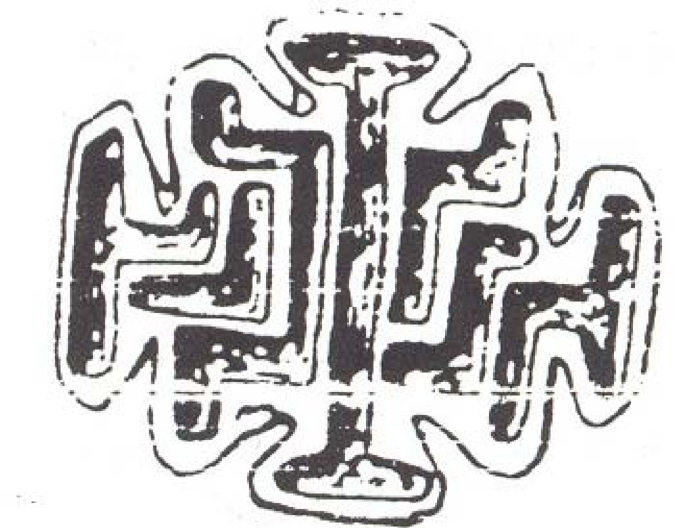


tif on a seal from Central Asia (after Possehl)





that of a cylinder seal. The motif is regular and portrays vegetation. Similar seals are also known in western Iran in an early context and

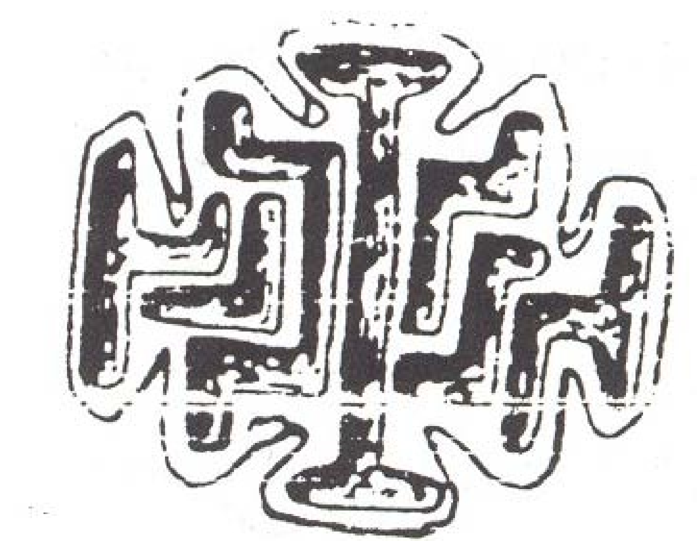


the bead from Mehrgarh could be considered as an early prototype of

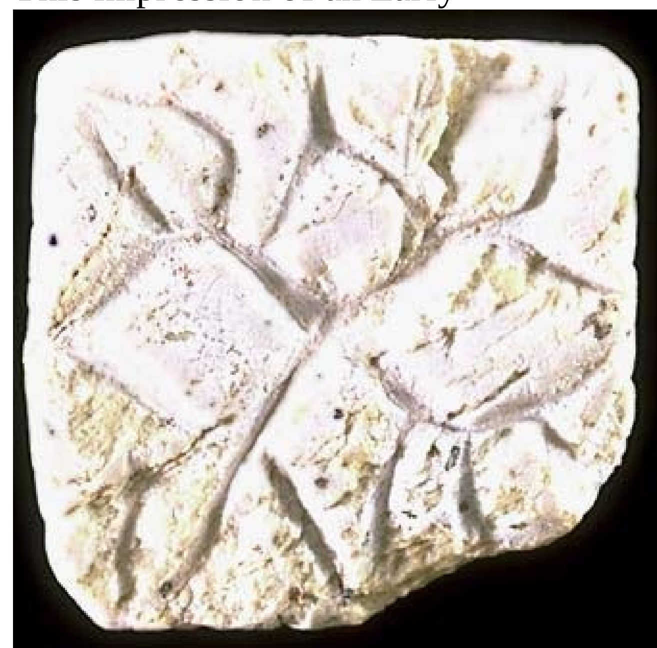
A geometric seal from
Baluchistan found in associa
tion with Quetta Ware culture

Geometric button seals from Mehrgarh, c. 3300 to 2800 BCof the Early Indus period
A geometric seal from Harappa (left) and a similar motif on a seal from Central Asia (after Possehl) **A geometric seal from**

the cylinder seal that later became popular in Mesopotamia.
Mesopotamian limestone cylinder seal and impres!sion—worship of Shamash, (Louvre). Indus Seals



that of a cylinder seal. The motif is
regular
and
portrays
vegetation.
This impression of an Early



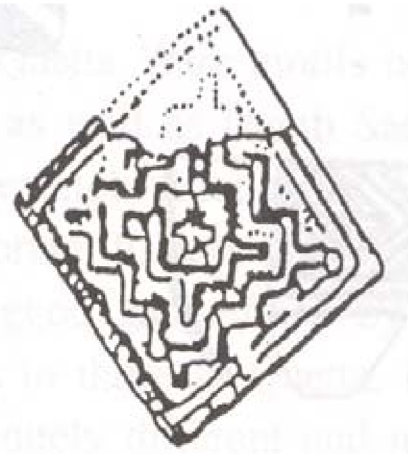
Baluchistan found in asso Early
Indus period and examples are available from even earlier times. Jarrige found a

This impression of an
Similar seals are also known in
Geometric button seals from Mehrgarh, c. 3300 to 2800 BC

cylindrical terracotta bead in one of the compartmented buildings of Mehrgarh Period II
Indus seal (Kot Diji phase,

Early Indus seal (Kot Diji





the bead from Mehrgarh could be c. 2800 BC) of a square

tion with Quetta Ware culture

A geometric seal from **cia- tion with Quetta Ware** of the Early Indus period

culture of the Early Indus Baluchistan found in associa tion with Quetta Ware culture

An Early Indus button seal from

(sixth millennium BC). When rolled out, this bead produced an impression much like

seal has several script

Geometric button seals from Mehrgarh, c. 3300 to 2800 BC

the cylinder seal that later became regular **script signs and two lad**

broken seal, presumaHarappa that of a cylinder seal. The motif isof the Early Indus period and

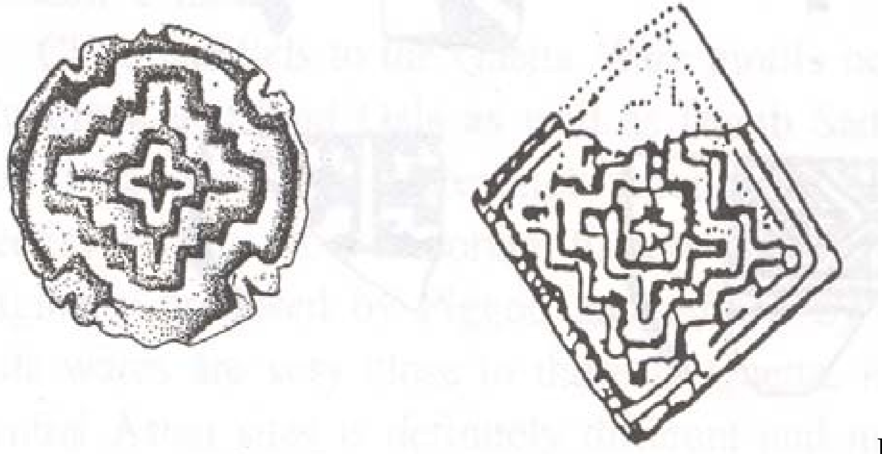


portrays vegetation. superficially engraved motifs



popular in Mesopotamia. Similar seals are also known in

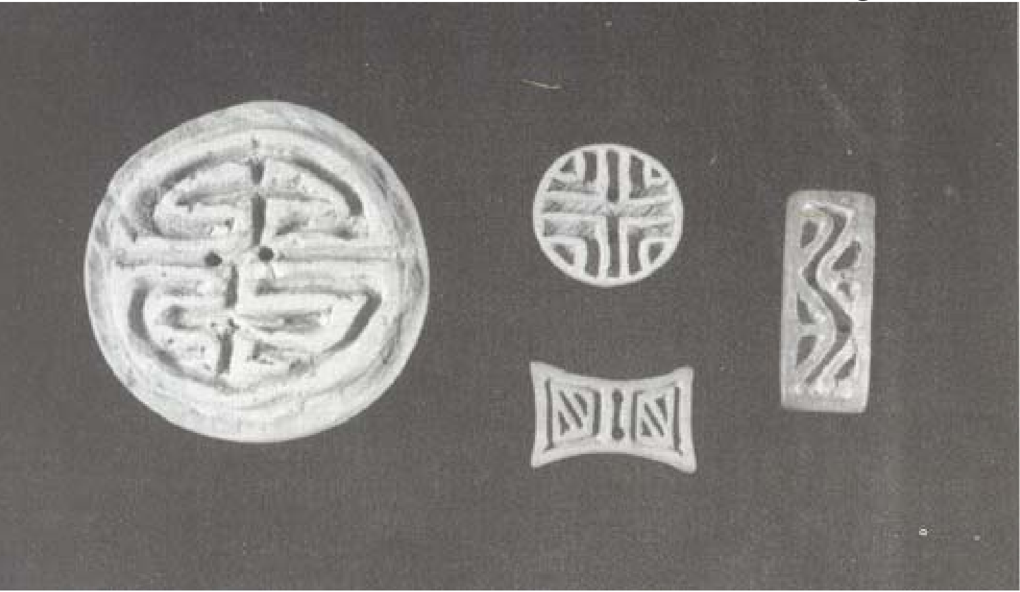
A geometric seal from Harappa (left) and a similar mo



by hand and not in

western Iran in an early context and that of a cylinder seal. The motif is

tif on a seal from Central Asia (after Possehl) the bead from Mehrgarh could be for making





regular

impressions. portrays vegetation. considered as an early prototype of This impression of an Early the cylinder seal that later became Similar seals are also known in

Indus seal (Kot Diji phase, The square/

c. 2800 BC) of a square



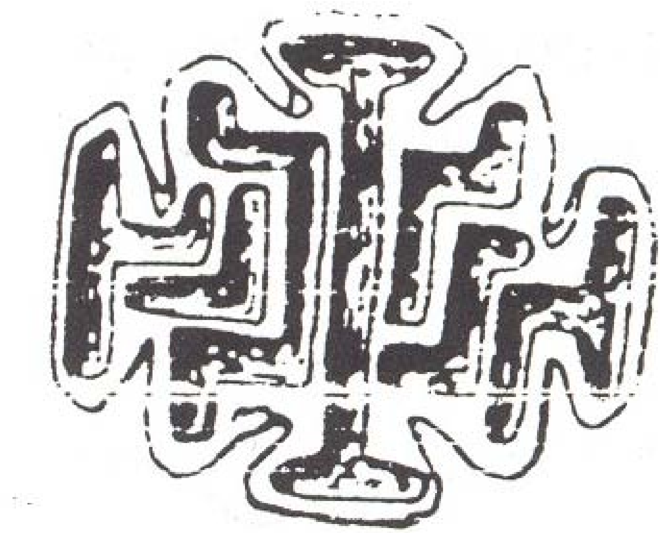
seal has several script
A geometric seal from Harappa (left) and a similar mosigns and two ladder like
tif on a seal from Central Asia (after Possehl)

motifs

popular in Mesopotamia. western Iran in an early context and An Early Indus button seal from
the diagnostic type of the Harappa the bead from Mehrgarh could be bly from the early part Cylindrical considered as an early prototype of seals are characteristic of
M e s o p o t a m i a n
This impression of an Early
Indus seal (Kot Diji phase, The impression of ac. 2800 BC) of a square broken seal, presuma

A round seal from 'Dilmun' in Persian Gulf

seal has several script **seal from Harappa** A geometric seal from Harappa (left) and a similar mo



the cylinder seal that later became c i t i e s popular in Mesopotamia. whereas the round type is **An Early Indus button** An Early Indus button seal from
Harappa
dingostic of the Gulf area. A geometric seal from A few cylindri
motifs
of the Harappan period Baluchistan found in associacal and round seals have tif on a seal from Central Asia (after Possehl)


Geometric button seals from Mehrgarh, c. 3300 to 2800 BC



This impression of an Early

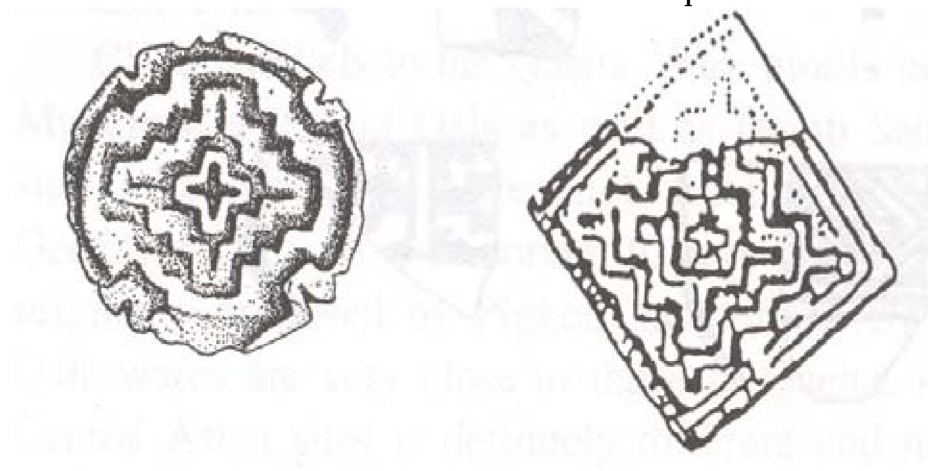
tion with Quetta Ware culture also been found at of the Early Indus periodHarappan sites and their



presence indicates a cul



tural contact of the Indus Indus seal (Kot Diji phase,
that of a cylinder seal. The motif is Valley
c. 2800 BC) of a square
regular broken seal, presumavegetation.
with theAn Early Indus button seal from andHarappa Gulf
Mesopotamia. Similarly, a
seal has several script and portrays
signs and two ladder like bly from the early part few square seals have



motifs Similar seals are also known inbeen

recovered from  western Iran in an early context and

Page 458 sites in Mesopotamia andthe bead from Mehrgarh could be the Gulf and these con considered as an early prototype of firm the presence of thethe cylinder seal that later became

 This impression of an Earlypopular in Mesopotamia.

Indus seal (Kot Diji phase,

The impression of a

The impression of a bro ken seal, presumably from the early part of the

bly from the early part

Harappan period

of the Harappan period

H a r a p p a n s o r t h e i r  agents in those areas.
Square stamp seals c. 2800 BC) of a square
A geometric seal from Harappa (left) and a similar mo
A geometric seal from Harappa (left) and a similar motif tif on a seal from Central Asia (after Possehl) seal has several script
on a seal from Central Asia (signs and two ladder like **)**
motifs
have
An Early Indus button seal from
most intensively Harappa studied. Usually made of
after Possehl

steatite (soapstone) and hardened by firing, each 


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Ancient Pakistan - An Archaeological History

seal bore an inscription, usually short, and a picture. The inscription was written in reverse, showing that it was usually read from sealings or impressions, not from the seal itself. All but a few of the

images on seals depicted a single animal, often with a feeding trough in front of it. The most common was the

unicorn, a creature with a single horn combining Indus Seals!

elements of a humpless bull and an antelope. Such very small number of seals bear scenes rather than individual animals. These seals were generally larger than average and must have had a special significance. While the depiction of the animals was standardized, with only small differences occurring in their detail, the scenes are unique, though some share a theme.

A typical Harappan seal (left) and its impression (right)



Back of a square Indus seal with a boss and a

hole for threading a string through
existence of flat terracotta seals intowns and cities, particularly in Mohenjo-daro; more



Zebu seals were generally large an beautifully exe
back to the aforementioned Early A seal (some call it a pendant) from Rehman Dheri, the cuted, and they had short
inscriptions. Other aniEarly Indus period. This seal is somewhat different Indus period. He draws attention tomals included the elephant, the rhino, the humpless from those of Harappa and Mohenjodaro in that it is similar seals from Central Asia, double-sided (the reverse side depicts two stags or two
especially
at
Alyn
Depe.
The
bull, the tiger, the water buffalo, the sheep, and the

mountain goats) and does not have a boss. Instead, two
goat, the wild creatures native to the Indus region. A
holes are drilled on one side for stringing through a carIndus Seals!rying cord. (after Durrani)
Fairservis has demonstrated the “unicorn seals” have been found in most Indus

the Quetta Valley culture of the than a thousand are known, while fewer than a
Early Indus period, c. 3,000 BC. hundred have been found of any other individual
Similar seals, only moredesign. Around fifty seals depict a zebu bull: these
sophisticated almostin alldesign and

are confined to Mohenjo-daro andsuperior in aesthetics, have been
Harappa, though one is known from Kalibangan.
found at Mehrgarh V, again going

geometric designs on the seals of
the Quetta Ware period are superb
Fairservis has demonstrated the



An assortment of the Indus seals and tablets (after Kenoyer) existence of flat terracotta seals in **An assortment of the Indus seals and tablets**

!

the Quetta Valley culture of the Early Indus period, c. 3,000 BC. Similar seals, only more


sophisticated in design and

superior in aesthetics, have been the sides generally range from 1.9 to 3.2 centimefound at Mehrgarh V, again going

ters. The largest square seal of Mohrenjo-daro is a
little more than 6.35 cm square. The more usual back to the aforementioned Early A seal (some call it a pendant) from Rehman Dheri, the
Indus period. He draws attention to
ones are around 2.54 cm. square and examples of
from those of Harappa and Mohenjodaro in that it is

1.27 cm square also are known. There are several  similar seals from
Central Asia,
Back of a square Indus double-sided (the reverse side depicts two stags or two
especially
at
Alyn
Depe.
The
seal with a boss and a
other types of impression-making seals. In 1993,
mountain goats) and does not have a boss. Instead, two





Mackay published 10
different types of seals at geometric designs on the seals ofhole for threading a

have its

A typical Harappan seal (left) and its impression (right)

A seal (some call it a pendant) from Rehman Dheri, the Early Indus period. This seal is somewhat different from

those of Harappa and Mohenjo-daro in that it is double sided (the reverse side depicts two stags or two mountain

goats) and does not have a boss. Instead, two holes are
rying cord. (after Durrani)the Quetta Ware period are superbstring through Mohenjo-daro: square with
perforated boss on reverse,

but this tradition does square with no boss and
not get transmitted to frequently inscribed on

Sind
or
both
Punjab.
The
sides, rectangular geometric motifs are no
A copper tablet with raised inscripboss, button withdoubt without
drilled on one side for stringing through a carrying cord.
(*after Durrani***)**tion from Harappa (after Kenoyer)



present in thelinear designs, rectangular Harappan tradition but it
with perforated convex
is the elegant carving of back, cube, round with peranimals, especially the
forated boss, rectangular bull and the unicorn, thatwith perforated boss, roundgives the Harappan an with no boss and inscribedaesthetic unquestionedon both sides.



Back of a square In Back of a square Indus

dus seal with a boss seal with a boss and a **and a hole for thread**hole for threading a **ing a string through.**

string through
(*after Kenoyer*)





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The square steatite seals are not very large;



and technological distinction in



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Broken steatite mold carved into a unique fan
Broken steatite mold carved into a

shape. This mold was probably used to make a unique fan-shape. This mold was **faience tablet depicted below and found on an eroded slope nearby at Harappa.**

probably used to make a faience

ried by a string. The smaller but this tradition does seals could have been hung from the waist or worn around the neck without much inconvenience but due to minute cracks in manufacturing and the weakness of soapstone on the interior of a seal, the seal often snapped off at the perforated knob or boss. Larger seals with sharp corners and a boss at the back do not hang in a manner that would have been comfortable. and many of the largest seals may have been kept in a pouch. This is indicated by gives the Harappan an the observation that some Indus seals have rather unquestioned aesthetic heavily abraded outside edges, especially thoseand technological

distinction in the contemporary world. In the Early Indus period, but this tradition does not get transmitted to Sind or Punjab. geometric motifs are no doubt present Harappan tradition but it is the elegant carving of animals, especially bull and the unicorn, that gives the Harappan an unquestioned and technological distinction contemporary world. In the Early Indus period,

the Thesquareseals

have a holed boss on the An assortment of the Indus seals and tablets (after Kenoyer)

A typical Harappan seal (left) and its impression (right) the Early Indus period,back to enable it to be car

tablet depicted below and found on



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an eroded slope nearby at Harappa. An assortment of the Indus seals and tablets (after Kenoyer)



directly adjacent to the face, but the interior carving retains a fresh, crisp line. This pattern suggests thatFairservis has demonstrated the the seal was wrapped in cloth, worn as amulet, or existence of flat terracotta seals in

used for visual identification. This observation alsothe Quetta Valley culture of the Harappan Civilization is almost synonymous with
leads to the conclusion that the Indus seals were extraordinarily beautiful seals, which its artisansEarly Indus period, c. 3,000 BC.

not used to make huge number of impressions, fashioned from steatite, and occasionally of silver, Similar seals, only more which in turn suggests that they may have been

sophisticated in design and faience, copper, and calcite. About 50 percent of
assumed.
superior in aesthetics, have been Harappan seals have been found at Mohenjodaro
The Pre-Harappan Precedents:
and when combined
for which the Indus Civilization is so well-known,
Harappa, the percentage goes up to almost 90
was not an invention of the Harappans. Seals ofIndus period. He draws attention to
different configurations were known to the Mesoposimilar seals from Central Asia, tamian, Iranians, and some oasis Bronze Age civili
no especially at Alyn evidence of any regional
Depe. The
geometric designs on the seals of the Quetta Ware period are superb
found at Mehrgarh V, again goingnumber The seals,with the back to the aforementioned Early

manner that would have been comfortable. and many of the largest seals may have been kept in a pouch. This is indicated by the observation that some Indus seals have rather heavily abraded outside edges, especially those directly

Imam-Zamin
do in modern Pakistan.
adjacent to the face, but the interior carving retains a fresh, crisp line.
Indus Seals**!**



A seal (some call it a pendant) from Rehman Dheri, the
A seal (some call it a pendant) from Rehman Dheri, the Early Indus period. This seal is somewhat different
Early Indus period. This seal is somewhat different from
from those of Harappa and Mohenjodaro in that it is
those of Harappa and Mohenjodaro in that it is double

double-sided (the reverse side depicts two stags or two mountain goats) and does not have a boss.

Instead, two holes are drilled on one side for stringing through a car**drilled on one side for stringing through a car- rying**

rying cord. (after Durrani)

Indus Seals! **cord. (***after Durrani***)**



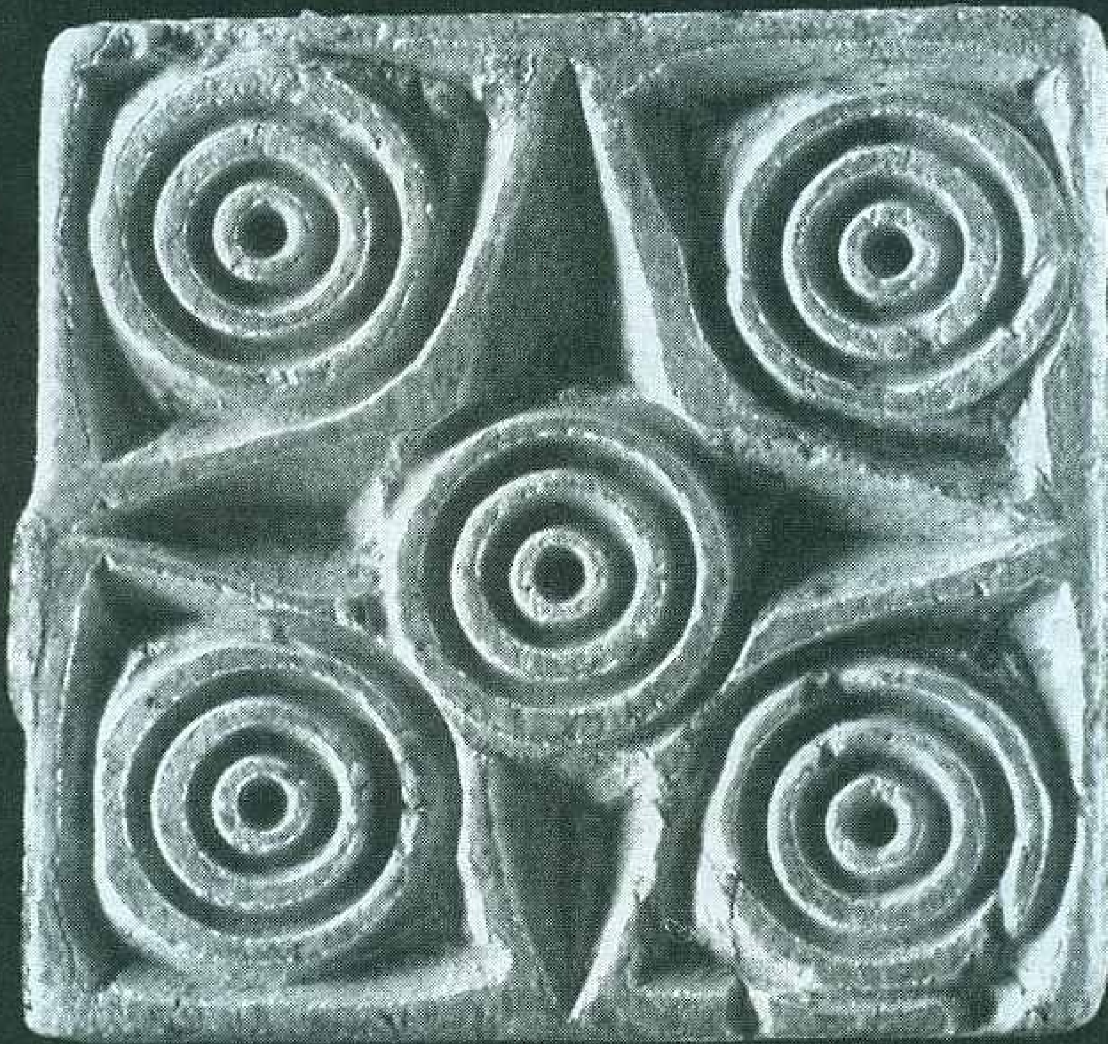


A double-sided square molded seal or amulet from A double-sided square molded seal or amulet from **Harappa**Back of a square Indus

This pattern suggests that the sealMesopotamians. Her argument, however, does not appear convincing. HarappaIndus Seals!seal with a boss and a was wrapped in cloth,Cylindrical seals worn as not



hole for threading a



amulet, or used infor visual are Mesopotamians. Her argument, however, does not appear convincing. identification. This observation also civilizational area. They are **A fine steatite button seal from Kot Diji period of** characteristic of the
leads to the conclusion that the
Harappa Mesopotamian civilization.
Indus seals were not used to make A solitary example has been

huge number of impressions, which mentioned earlier as being in turn suggests that they may have recovered from Mehrgarh of been used for purposes other than the Early

trade. find any
Settlement phase of Baluchistan. We do not

other example of Harappan A typical Harappan seal (left) and its impression (right) not

string through

seals are Cylindrical
known in the Harappan but this tradition does civilizational area. They are



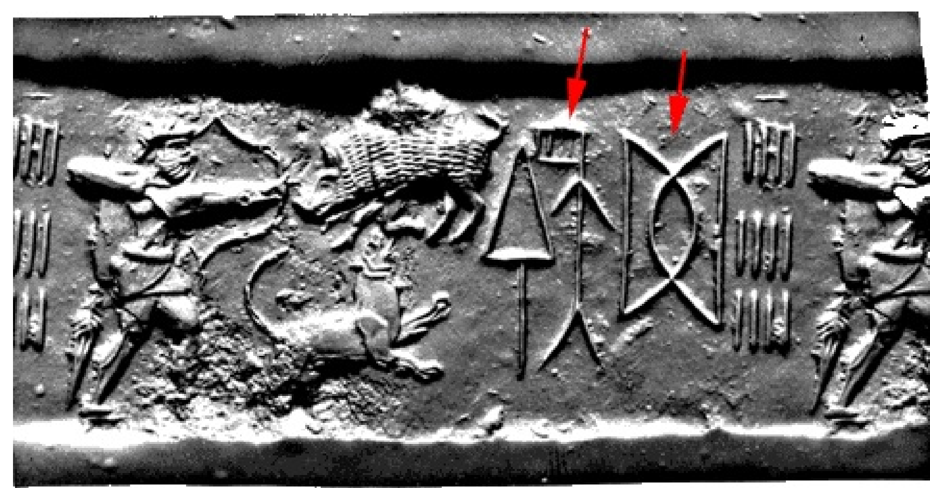
not get transmitted to the characteristic of the Sind or


Punjab. The Mesopotamian civilization. geometric motifs are no A solitary example has been doubt
present in the mentioned earlier as being
recovered from Mehrgarh of Harappan tradition but it
Steatite cylindrical seal from Susa, Iran. The motifs on this
the Early
seal, typical Harappan, depict a short-horn bull with head low
Settlement phase
Steatite cylindrical seal from Susa, Iran. The motifs on
is the elegant carving of





this type of seal in any later Closely related to the square type period, neither in carved steatite seals are the moldedSind, **A patterned bead type seal and its impression from the**in
A patterned bead type seal and its impression from tablets, that is, a large number of
early settlement period at Mehrgarh, sixth millennium the early settlement period at Mehrgarh, sixth millensimilar seals **BC, which Jarrige interprets as a cylindrical seal akin to** from a
this seal, typical Harappan, depict a short-horn bullthe Steatite cylindrical seal from Susa, Iran. The motifs on thisof Baluchistan. We do notered , feeding from a basin. A second bull figure is visible, and
find any
with head lowered, feeding from a basin. A second bullseal, typical Harappan, depict a short-horn bull with head low
a long inscription appears above the two animals.
figure is visible, and a long inscription appears above theered , feeding from a basin. A second bull figure is visible, and this type of seal in any later(after Kenoyer) gives the Harappan an
period,
Baluchistan
two animals. (*after Kenoyer*)a long inscription appears above the two animals.
neither in
nor
in
Sind,
and Derajaats, or Cholistan. We technological
unquestioned aesthetic (after Kenoyer) **later Mesopotamian seal**nium BC, which Jarrige interprets as a cylindrical standardseal akin to later Mesopotamian sealHere the raw


distinction detect

mold. in the

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material is generally faience but

zations of Central Asia before them. Similarly, stoneAn assortment of the Indus seals and tablets (after Kenoyer)

examples of terracotta and copper

seals have been found in the Greater Indus Valley

presence of cylindrical seal

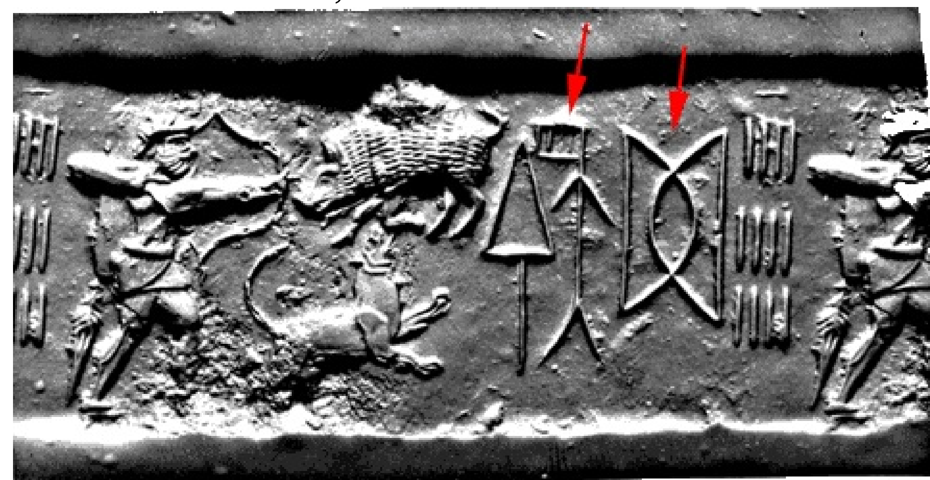
contemporary world. In

in Central Asia except one

the Early Indus period,

found in Afghanistan. This

are also found. Here, in contrast to


seal apparently belongs to much before

the advent of the Harappan Civilization

the

common

and their use was not uncommon in the Early Indus seals, the Page 459 late Harappan period and steatite


clearly embodies Indusperiod during the third and fourth millennium BC

inscription and the animal motif is motifs as well as the Indusand examples are available from even earlier times.script. All subsequentA three-sided Harappan tablet
in the ‘positive’, which means that
Jarring (16), for example, found a cylindrical terra

they were not meant for sealing.
cotta bead in one of the compartmented buildings ofThe impression of a solitary cylindrical seal found in AfghaniMehrgarh Period II (sixth millennium BC). WhenCopper and faience tablets,stan with clearly Harappan motifs, of undetermined age.
developments were in flat seals of varying geometric
shapes which culminated in

Derajaats, or Cholistan. We also do not detect presence of cylindrical seal in Central Asia except one found in Afghanistan. This seal apparently belongs to late Harappan period and clearly embodies motifs as well as the Indus script. All subsequent developments were in flat

seals of varying geometric shapes which culminated in rolled out, this bead produced an impression muchproduced in multiple copies from **The impression of a solitary cylindrical seal found in Af**

like that of a cylinder seal (see figure above). The
square and rectangular shaped seals. Their size also decreased as the technology
ghanistan with clearly Harappan motifs, of undetermined

molds are found at Mohenjodaro as progressed and the use of steatite grew. As far as the circular seals are concerned, they**age.**motif

is regular and portrays vegetation. Similar
well as at Harappa. A molded are the hallmark of the Gulf region and are seals are also known in western Iran in an early square and rectangular shaped seals. Their size also decreased as the technology copper tablet has recently (2007)practically unknown in the Harappan tradition. One progressed and the use of steatite grew. As far as the circular seals are concerned, they
been reported as a surface find from solitary exception is a circular seal found at Lothal. are the hallmark of the Gulf region and are 334

This was a surface find and thus it is difficult to say
Ganweriwala in Cholistan. Several
as to what time period did it really belong orsolitary exception is a circular seal found at Lothal. copies of one copper tablet have whether it was an Indus seal or an 'imported' object.
practically unknown in the Harappan tradition. One



been found at Mohenjodaro; it This was a surface find and thus it is

difficult to say



An interesting and rather unique as to what

time period did it really belong or



2.54 cm. square and examples of 1.27 cm square Broken steatite mold carved into a
also are known. There are several other types of Indus Seals! unique fan-shape. This mold was Ancient Pakistan - An Archaeological History
impression-making seals. In 1993, Mackay published 10 different types of seals at Mohenjodaro: square with perforated boss on reverse, square with no boss and frequently inscribed on both sides, rectangular without boss, button with linear designs, rectangular with perforated convex back,

probably used to make a faience generally wet clay. They are linked to the
tablet depicted below and found on invention of the latter cuneiform writing on
an eroded slope nearby at Harappa.

clay cylinders. In Mesopotamia and western Iran they were used as administrative tool, jewelry and as magical amulets, later versions would employ notations with Mesopotamian hieroglyphs. In still later periods, they were used to notarize or attest to multiple impressions of clay documents. Graves and other sites housing precious items such as gold, silver, beads, and gemstones often included one or two cylinder seals, as honorific grave goods or the magical protector of the grave goods. Round seals are known both from Mesopotamia as well as the Persian gulf. Some of these seals have the Indus motif engraved on them. This undoubtedly shows a cultural



influence of the Indus Valley on the settlements around the Persian Gulf. The seals from Central Asia are also round but no

cube, round with perforated boss, rectangular with perforated boss, round with no boss and inscribed on both sides. The square seals usually have a line of script along the top of the seal and a



seal has so far been found which has any engraving that can be construed as writing. A group of Indus seals with animal motif. When impressed on a These seals are rather primitive and ele

mental.
plastic material, such as clay, these seal would create a
Carved intaglio seals and seal'positive' impression of raised inscription and animal motif. Not impressed clay are first seen at Harappa all Indus seals are of this nature; some are 'positive' and, if imduring the Early Harappan, Kot Diji Phase,

carved animal in the central

Long rectangular seals and a terra cotta sealing
(ca. 2800-2600 BC). An unfired seal that

pressed on a plastic material, would create a 'negative' image. A double-sided square molded seal or amulet from Harappa we attribute to ca. 2800-2600 BC, comes portion. The (bottom) with Indus script. Such 'seals' are thought to be amulets rather than seals.Harappa (after Kenoyer) animals
depicted andonthethe beadseals,

Mehrgarh could be considered

usuallymales, includeas an early prototype of the cyl
domestic and wild animals as
popularwell in Mesopotamia.mythicalFlat

as

seals, only more sophisticated in

creatures such

design and superior in aesthet

as the

ics, have been found at

unicorn. Some seals contain

Mehrgarh V, going back to the

more complex iconographic 3500 BC.The geometricrepresentdescenes that

signs on these seals are truly

mythologicalFairservisor hasreligious

superb. also

events. The smaller seals

flat terracotta seals in the Quetta
Valley
culture
of
the

could have been hung from

Early

the waist or worn around the
tentionneck to similar seals from without much Central Asia, especially at Alyn
inconveniencesouthernbut due to
(17). cracks inminute The Mesopotamian seals manufacturing

were generally cylindrical, while

and the

round seals have been discov

weakness of soapstone on

ered in the Persian Gulf and

Turkmenia. the interior of a seal, the

ered in Iran were both cylindrical

seal often snapped off at the

and round. A cylindrical seal is a

perforated knob or boss.

cylinder engraved with a 'picture

Larger

story', used to roll an impression

seals with sharp

onto a two-dimensional surface,

corners and a boss at the back do not hang in a

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An example of a four-sided tablet from Harappa.

One side is comprised entirely An example of a four-sided tablet from Harappa. One side is
of script and has six characters while the other three sides probably describe

comprised entirely of script and has six characters while the other three sides probably describe some mythological themes.

335
Page 461
been



coated with a mixture of steatite dust mixed with water and then baked, fusing the

coating and hardening the
of
the
Harappan Civilization - The Material Culture steatite body of the seal itself.

Three clay sealings from Harappa. Seals are abundant but the seal impressions on clay (the sealings) are not many in the Harappan sites. One exception is Lothal where they are found in abundance

from a mixed context near to the occupation sur

A copper tablet with raised inscrip

faces where a number of *in situ* inscribed objects

tion from Harappa (after Kenoyer)

have been discovered. The seal has a relatively directly
simple geometric design of four intersecting lines that create eight triangular sectors on the seal. The edges and surface of the seal are smoothed and
A double-sided square molded seal or amulet from rounded, but there are numerous manufacturing
or Harappa
worn as
for visual





Terra cotta tokens or tablets from Harappa. In Area G, excava
tors found a concentration of as many as 31 identical cylindrical
Terra cotta tokens or tablets from Harappa. In Area G,
terracotta tablets (top center), but it is not known what they
excava- tors found a concentration of as many as 31 iden
could have been used for.
tical cylindrical terracotta tablets (top center), but it is not known what they could have been used for.

While a truly large number of seals and tablets have been found, the occurrence of sealings, that is, the seal impression on clay, is rare; a few from Harappa and probably one or two from Mohenjodaro. It is only at the site of Lothal where a large number of impressions have survived. Most of these are tags had been probably attached to bales of goods, for reverse sides usually show traces of packing materials.

Indus Seals !Indus seal-making tradition has had a profound and wide-ranging influence on the borderlands, almost up to Mesopotamia. The technology of seal-making and the motifs same size and weight and may represent an attempt to adopted by these cultures although retaining the

grinding striae that are still
create a standard currency or medium of exchange. The fact indigenous shape of the seals intact. We find quite a few examples of the Indus motifs,
that
such
copper
visible. The seal may have
tablets of even the Indus writing, on round seals of the Gulf region and cylindrical seals of

Mohenjodaro in any significant numbers indicates that they Mesopotamia and western Iran. A good example is the cylindrical seal found at Susa in from a

Broken steatite mold carved into a or some other material,

were limited to interactions and communication at this site
and the perforated boss on western Iran. This seal clearly depicts an Indus bull with a feeding trough infront, along

the raw **unique fan-shape. This mold was** **alone and not on a regional scale. A third type of the Indus**

with the Indus script on top of the animal motif, exactly in the accepted fashion of the seals are the miniature seals or amulets, engraved by hand
the back may have been
Page 466 faience but

probably used to make a faience

and not intended for making impressions.
Harappan Civilization.
used to hold a cord. The
motif incised onto this seal

tablet depicted below and found on in the very early occupations at Harappa. Vats, the

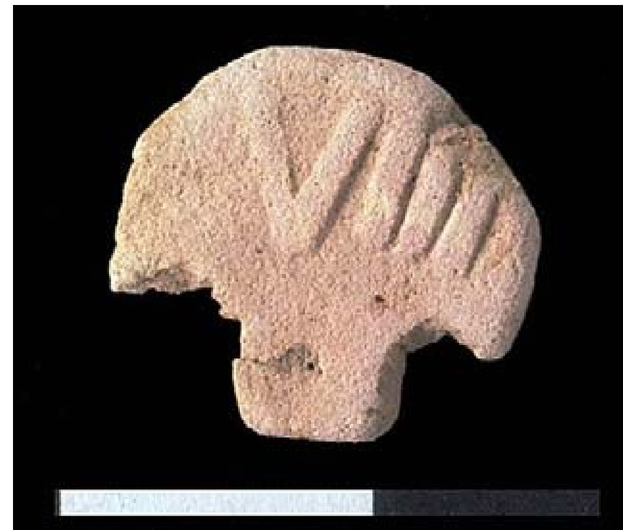
seals, the an eroded slope nearby at Harappa. **excavator, satisfactorily indicated that the ordinary square o n p o t t e r y**

steatite stamp seals, typical for all Indus sites, were reduced attributed to the

both in size and numbers in the earlier strata and the same
Kot Diji Phase.

appears to be true for theterracotta and faience mouldSimilar seals, with
pressed sealings or 'sealing amulets'. Besides being very on this motif
small, the miniature variations miniature tablets are have also been found at
characterised by the absence of any knob or hole and their

other Kot Diji sites, such
small size and thinness makes them difficult to handle.
as Tarakai Qila, Kaliban
This, coupled with the very superficial nature of the writing
Of special interest are the very small seals or tablets found
is broadly similar to motifs
i n s c r i b e d
sherds
!
A three-sided Harappan tablet
A three-sided Harappan tablet
seals or



gan,
and
Rahman-dheri.
on them, which in some cases is little more than scratched
on the surface, precludes the possibility of their having
These seals all have simi
been used for stamping, which was undoubtedly the
larly roughened or matte
purpose of the later, larger seals. The miniature tablets are
it



surfaces that may be the

result of thealso characterised by the absence of the 'unicorn' and other or animals found on the Iater stamp seals. The miniature erosion

flaking off of an original

tablets come in various geometric shapes, ranging from

surface glaze. The similar

square to cylindrical, with and without holes. These tablets

ity between sites in design

are made of steatite although a few terracotta examples

motifs and in the sharply

A collection of three-sided Harappan tablets (after have also been found. They are common at Harappa but are

A copper tablet with raised inscripabsent in Mohenjodaro and other Indus sites.

delineated edges of the A copper tablet with raised inscription from Harappa

designs suggests the exis

tion from Harappa (after Kenoyer)

In the same context are the thin copper leafs with incised

tence of a well-definedwriting and animal motifs. They are exclusively foundat style across the

Page 462

Mohenjodaro although ten pieces

carving have recently been

northern part of the Indus

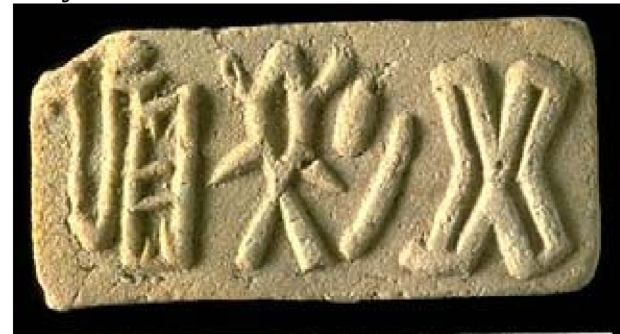
recovered at Harappa, also. Obviously, these incised copper

pieces were not intended for making impressions. Inscribed

tablets, along with the miniature seals, mentioned above,

flect a single workshop or

may have functioned as ritual tokens or souvenirs, not



shrines in Pakistan today. Malate Shendge (one workshop and *The Inscribed*

Calculi and the invention of writing: the Indus View, then J. of developed their own atel
Econ. and Soc. Hist. of Orient, Vol.28, No.1, 1985) is of
iers at other sites.

the opinion that these miniature tablets served as ‘calculi’
on the pattern found with the Theresearchat and the Elamites
Harappa by the HARP team

shows a dramatic change
Page 463
during the later part of the
Kot Diji Phase. The early


A collection of seals and

A collection of seals

tablets from a single house **and tablets from a sin**ing to the southern gateway

gle house along the of Mound E at Harappa. **main street lead- ing to** The association of these

the southern gateway
different types of objects
together in one house show
of Mound E at that some people, possibly perhaps seal carvers who
were
trained
originally
unlike the molded or inscribed amulets available at some
in
Harappa. The associa

merchants, were using a **tion of these different**
wide variety of inscribed

types of objects to
objects

gether in one house show that some people,
possibly merchants, were using a wide variety of inscribed objects

A molded terracotta tablet from Harappa (*Kenoyer*) **A molded terracotta tablet from Harappa (after Kenoyer)**



a

button seals made of carved bone from the Ravi
phase are replaced with carved soapstone or stea

raw

tite seals having geometric incised designs (2). Some of these seals are bleached white and glazed to create a hard surface suitable for repeated stamping. The discovery of a terracotta sealing of a square seal with script and a geometric or plant mo tif indicates that they were in fact used for such pur poses.

The geometric motifs akin to those in Central Asia and the Quetta Valley are no doubt present in the Harappan Civilization but it is the elegant carv

the

ing of animals, especially the bull and the unicorn, that gives the Harappan an unquestioned aesthetic and technological distinction in the contemporary world. The earliest example of this type is found in the Early Harappan period, where we find a pair of carved ivory seals at Rehman Dheri (Durrani, the excavator, calls them pendants) of Kot Diji culture
sence of any knob or hole. Their small size and thinness makes them difficult to handle. This, coupled with the very superficial nature of the writing on them, which in some cases is little more than scratched on the surface, precludes the possibility of their having been used for stamping, which is supposed to be the purpose of the larger seals. The miniature tablets are also characterized by the absence of the 'unicorn' and other animals found on the stamp seals. Another important characteristics of these miniature seals or tablets is that while the square steatite seals, almost all of which are unique, the tablets are often multiple copies.

There are numerous instances of (1) incised steatite tablets with copies of the same signs and/or motifs and (2) duplicate bas-relief tablets of faience or terracotta made from the same mold (18). The molds themselves could have been made of wood or clay or stone. Copies of incised tablets and dupli

and both of them have animal motifs. The HarappanA three-sided Harappan tablet cates of molded tablets have been found in large

tradition of seal designs seems to have its begin
ning here.
numbers at Harappa. They are always found in trash, fill, or street deposits. Why tablets were

it



A collection of three-sided Harappan tablets (*Kenoyer*)

A collection of three-sided Harappan tablets (after Tablets: An important category of the IndusKenoyer)made, how they were used, and why they were dis

seals is that of ‘miniature seals’. These are small tablets, sometimes incised on one side, sometimes on two, and sometimes on three or even on all four sides. These tablets come in various geometric shapes, ranging from square to cylindrical, with and without holes. The miniature seals or tablets are

Page 462made of steatite although a few terracotta examples

have also been found. They differ from the square seals for which the Harappan Civilization is so fa mous. Besides being very small, the miniature seals or miniature tablets are characterized by the ab carded remain intriguingly unanswered questions.

Their intrinsic interest lies not only in the script that they often bear, but even more so in the iconography, which provides an important glimpse, however fragmentary, into details of Harappan ideology, particularly for the time frame from ca. 2400 to ca. 2000 BC. For a more detailed discussion see ref. 18.

Copper and faience tablets, produced in multiple copies from molds are found at Mohenjo-daro as well as at Harappa. A molded copper tablet has recently (2007) been reported as a surface find from Ganweriwala in Cholistan. Several copies of one copper tablet have been found at Mohenjo-daro; it shows a hunter with a bow and wearing a horned heddress, similar to those depicted in figurines. These copper tablets are approximately the same size and weight and may represent an attempt to create a standard currency or medium of exchange. The fact that such copper tablets are not found outside of Mohenjo-daro in any significant numbers indicates that they were limited to interactions and communication, or perhaps any other use, at this site alone and not on a regional scale.

While many of the tablets are rectangular in form, others were made in circular, half circle, or fan shapes and even in the form of trees, fish, hares, or other animals. Most tablets are flat in cross-section, but others are triangular, deeply rectangular to square, plano-convex, biconvex, or almost cylindrical. This last form has led to much confusion in the literature as they are often incorrectly referred to as cylinder seals. So far, no true cylinder seals have

been recovered from the HARP excavations at (see Frenez & Tosi (20) for a review of this mate Harappa or anywhere else, although the Central
finished as a single operation, before even roughing out the inscription was undertaken.

The inscription was then carved and the back of the seal and the boss were then finished. Asian type of cylinder seal is reported from earlier The boss was carved to
excavations at Harappa and from other sites (19).rounded shape and a deep V

In the same context are the thin copper leafs was carved along the length at
with incised writing and animal motifs. They are exright angles to the perforation,
clusively found at Mohenjo-daro although ten pieces which was done next. This
have recently been recovered at Harappa also. Obwas a most often a two-step
viously, these incised copper pieces were not indrilling operation, which was
tended for making impressions. Inscribed tablets,usually angled slightly down
along with the miniature seals, mentioned above,into the body of the seal from
may have functioned as ritual tokens or souvenirs,opposite sides of the boss. As
not unlike the molded or inscribed amulets availablea final step, the seal was

at some shrines in Pakistan today. Malate Shendge coated with a mixture of (4) is of the opinion that these miniature tablets
a


steatite dust mixed with water
served as ‘calculi’ on the pattern found with theand then baked, fusing the Three clay sealings from Harappa. Seals are abundant but the
Elamites and the Mesopotamians. Her argument, coating and hardening the seal impressions on clay (the sealings) are not many in the
however, appear to be wanting.
Three clay sealings from Harappa. Seals are abundant
Harappan sites. One exception is Lothal where they are
steatite body of the seal itself.

Cylindrical seals are not known in the Harap
pan core area. A solitary example has been men
tioned earlier as being recovered from Mehrgarh of
the Neolithic settlement phase of Baluchistan. We
do not find any other example of this type of seal in
any later period, neither in Baluchistan nor in Sindh,
Derajaats, or Cholistan. We also do not detect the
presence of cylindrical seal in Central Asia except
one found in Afghanistan. This seal apparently be
longs to late Harappan period and clearly embodies
Indus motifs as well as the Indus script. All subse
quent developments were in flat seals of varying

but the seal impressions on clay (the sealings) are not
found in abundance
many in the Harappan sites. One exception is Lothal where they are found in abundance While a truly large number
of seals and tablets have

rial). From the HARP excavations at Harappa, only six sealings or "tags" have been identified, all

of been found, the occurrence which were partially hardened through low firing, of sealings, that is, the seal possibly in a hearth, hot ashes, or rubbish fire. Due impression on clay, is rare; to the secondary contexts of the sealings, it is not a few from Harappa and possible to determine if the hardening was done probably one or two from intentionally as a way to archive a sealing, or unin Mohenjodaro. It is only at tentionally as a part of post-deposition pro-cesses. the site of Lothal where a At Harappa, as at Lothal, it was the at Ieast lightly large number of seal

geometric shapes which culminated in square and



impressions have survived. rectangular shaped seals. Their size also de baked condition of the tag fragments that permitted Most of these are tags had Terra cotta tokens or tablets from Harappa. In Area G, excava been probably attached to creased as the technology progressed and the use them to be recovered intact. Unbaked specimens
tors found a concentration of as many as 31 identical cylindrical that are not immediately recognized as impressed of steatite grew. As far as the circular seals are con terracotta tablets (top center), but it is not known what they bales of goods, for the cerned, they are the hallmark of the Gulf region and
are likely not to be preserved at many Indus sites, could have been used for. reverse sides usually show
are practically unknown in the Harappan tradition.
which may go some way toward explaining why traces of packing materials.
such seal impressions have rarely been recovered One solitary exception is a circular seal found at Indus seal-making tradition has had a profound and wide-ranging influence on the Lothal. This was a surface find and thus it is difficult borderlands, almost up to Mesopotamia. The technology of seal-making and the motifs to say as to what time period did it really belong or carved on the seals were freely are imprints with script on ceramic vessels that whether it was an Indus seal or an ‘imported’ object. indigenous shape of the seals intact. We find quite a few examples of the Indus motifs, were stamped before firing. These are found almost

even the Indus writing, on round seals of the Gulf region and cylindrical seals of 338 Mesopotamia and western Iran. A good example is the cylindrical seal found at Susa in
western Iran. This seal clearly depicts an Indus bull with a feeding trough infront, along with the Indus script on top of the animal motif, exactly in the accepted fashion of the Harappan Civilization. Page 466

An interesting and rather unique example of Harappan seals has been found at Gola Dhoro in Gujarat (Late Harappan period). This a square seal but formed in the shape of a ’pill-box’. The compartment is provided with a slot for sliding a flat lid in and out. On one of the flat sides there is the usual Harappan animal motif with inscription. Two side panels have inscription only. A through hole is provided for carrying this ‘pill-box seal’ on a string. No other example of such a form has been found anywhere in any of the Harappan sites. It appears that it was an amulet rather than a stamp seal.

Sealings: Closely related to seals, are the “sealings” and “seal impressions”. The former is

impression stamped on soft clay used to seal a container (pot, box, room, etc.) and the latter is the imprint stamped on a ceramic vessel before firing. Very few of the first have been recovered from Indus Seals!Harappa, or indeed from any Indus site with the notable exception of Lothal where 93 specimens were retrieved clustered mostly in the area of a structure, termed a "warehouse", by the excavator

mentioned earlier as being recovered from Mehrgarh of the Early Settlement phase Ancient Pakistan - An Archaeological History of Baluchistan. We do notexclusively on those Harappa Period 3C vessels Steatite cylindrical seal from Susa, Iran. The motifs on thisembody the find any

called "pointed base goblets". To judge from the transmission of vital technology into the Dilmun cul

other example of

seal, typical Harappan, depict a short-horn bull with head low
ture simultaneously with the rise of an early ‘state’ quantities of sherds recovered at Harappa, such

this type of seal in any later

vessels were mass-produced in the tens if not hun
ered , feeding from a basin. A second bull figure is visible, and 1/'1% 5*6.#54!+% 6!'(6% '88!'#% 5*% 4-#5'(% .)*1!L16% 5* '4'*+)*%1/!%5+!'%1/'1%1/!%#)-*+%6!'(6%051/%7*+-6on Bahrain (8). We are left with a list of essential,'/#'5*$%6-HH!61!+%1/'1%1/!%6!'(6%:!

period, dreds of thousands. A very small percentage ofin

+!J*51!(3% 8)5*1 but
poorly
answered
5*6.#5815)*6 0!#! 9'+! 43 :7*+5'*6; 4-1 8#)8)6!+ 1/!
questions
a long inscription appears above the two animals. concerning the1)%'*%'..-(1-#'15)*%)2%&'#'88'*%1#'+!#6F;%<M'#8)('$

neither Baluchistan

these vessel fragments recovered by HARP bear
)15)%1/'1%1/! #)-*+%2)#9 6/)-(+%4! '66).5'1!+%051/situation surrounding the adaptation of>??O'B% P>AEF% Q)*"!#6!(3$% 0/!*% M'#8)('% 2).-6!+%)* Dilmun’s

nor in Sind,

impressed stamps with one or more signs. The
1/!%9'#5159!%1#'+!%<&'(()%=%,-./'*'*%>?@AB%CDAEF 1/!%./'#'.1!#5615.%.5#.-('#%6/'8!%'()*!$%/!%6-HH!61!+

first indigenous sealing technology from the Indus
seals used to make these imprints are of the long
G#)9% 1/56% 159!%)*0'#+6%)85*5)*6% "'#3% 4-1 '*% 7#'*5'*% 6)-#.!$% *)15*H% 1/'1% :M!#/'86% 51% 0'6% 5* H!*!#'((3% 85")1% '#)-*+% ,'/#'5*% '6% I% 52% *)1Valley: By what route did this sealing technology 7#'*%<R-6'E%1/'1%1/!%S!'#%T'61!#*%7*+-6%1#'+!#6%J#61
rectangular form found only in Period 3C, just as
6)-#.!% I%)*!%)2% 1/!% 9)61% 598)#1'*1% *)+!6% 2)# '+)81!+% 1/!% ().'(% .5#.-('#% 2)#9% 2)#% 1/!5#% 6!'(6$
spread? Who were the agents instrumental in its 0/5./%0!#!%1/!*%1)%4!.)9!%1/!%9)+!(6%)2%1/!%U-(2%
pointed base goblets are also found only in that
1#'+!#6% !98()35*H% 1/!% J#61% .5#.-('#% 6!'(6F% K51/
transmission? When did it happen and what role did

#!2!#!*.!%1)%1/!%.5#.-('#%6!'(6%051/%7*+-6%1!L1$%M)116$ Derajaats, or Cholistan. We 6!'(6;F% <>??O'B% P>AEF% V!.!*1(3%)1/!#% 6./)('#6% <!FHF

chronological period (*ca.* 2200-1900 BC). Six 2)#% !L'98(!$% '#H-!+% 2)#% '*% 5*159'1!% #!('15)*it play in the emergence of social complexity inN5+'(!% CDDOW% CDDAE% /"'!% 8#)8)6!+% '% /)61%)2% *!0 sherds of
pointed
base
goblets
with
identical

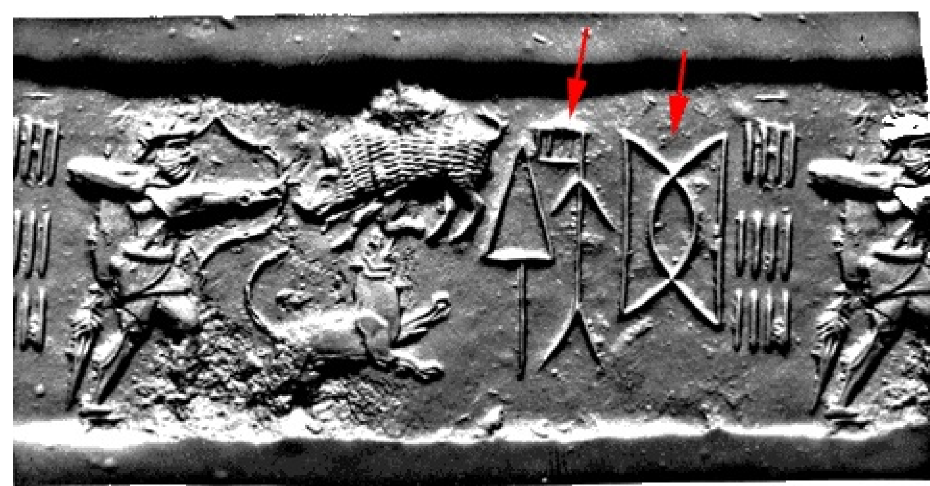
4!10!!*% 1/!6!% 6!'(6% '*+% ,'/#'5*B% :71% 6-HH!616$% 2)# not 5*1!#8#!1'15)*6$% 5*% 8'#15.-('#% .)*.!#*5*H% 1/!% .5#.-('# Early Dilmun society? Laursen (8) has made analso do detect the 6!'(6% 051/% 7*+-6% 5*6.#5815)*6$% 4-1% 1/)6!% 05((% 4!

stamped imprints have also been recovered from
!L'98(!$%1/'1%'% .)**!.15)*%!L561!+%4!10!!*%,'/#'5*
effort to answer these questions and tried to map

'*+% 1/!% 7*+-6% N'((!3% 0/5./% 9'3% /"'!% .)*1#54-1!+ presence of cylindrical seal +!'(1% 051/% 5*% 9)#!% +!1'5(% 4!()0F

the site of Lahoma Lal Tibba located *ca.* 24 km

**East-Southeast of Harappa (21). These provide in Central Asia except one strong evidence for the distribution of ceramics befound in Afghanistan. Thistween Harappa and smaller settlements in its hinterseal apparently belongs to land. Persian Gulf Seals. During the later third late Harappan period andmillennium, the people of Dilmun began to make clearly embodies Indusround (Persian Gulf) seals, with simple motifs rep
resenting mainly animals or a human foot and with motifs as well as the Indusa high domed boss with a central groove. These script. All subsequent**


continued in use into the early second millennium. A
number of similar round seals bearing Harappan
The impression of a solitary cylindrical seal found in Afghani

motifs, particularly of a short-horned bull, and occa
stan with clearly Harappan motifs, of undetermined age.
sionally Harappan script have also been found, par

ticularly in Bahrain and at Ur, but also from Failaka,

developments were in flat seals of varying geometric shapes which culminated in Babylon, Girsu, and Susa and from Mohenjo-daro !"#$!%#$!&#square and rectangular shaped seals. Their size also decreased as the technology



!"and

Chanhu-daro in the Indus realms. Some of798#!665)*6%'*+%+#'05*H6%)2%U-(2%X38!%6!'(6%051/%7*+-6%1!L1%'*+%4-((%9)152%2)-*+%5*%T'#(3%Y5(9-*%4-#5'(%9)-*+6%)*%,'/#'5*B

progressed and the use of steatite grew. As far as the circular seals are concerned, they X'4(!%>F%*)F%>>W $" X'4(!%>%*)F%A@F%<R.'(!B%>AD!EF quences, but in other cases the inscriptions indus text and bull motif found in Early Dilnum burial are the hallmark of the Gulf region and are mounds on Bahrain

cluded some signs or sign combinations unknown in

practically unknown in the Harappan tradition. One

the Indus region, suggesting that they rendered

solitary exception is a circular seal found at Lothal.

These may perhaps have been the property of Dil

This was a surface find and thus it is difficult to say

munites who were closely engaged in Harappan

as to what time period did it really belong or

seals and the majority were uninscribed.

whether it was an Indus seal or an ‘imported’ object.

The relative chronology of classic Persian
Gulf seals and those with Harappan motifs and in

An interesting and rather uniquescriptions is unknown: however, it is possible thatexample of

the Harappans introduced the Dilmunites to the idea

Harappan seals has been found at Gola Dhoro in

of using stamp seals. No written records are known

Gujrat. This a square seal but formed in the shape of

from Dilmun, althoughh familiarity with Mesopota

’pill-box’. The compartment is provided with a slot

velopment of literacy. Crawford (22) notes that the



for sliding a flat lid in and out. One one of the flat A circular seal of Gulf type from

round stamp seals of Dilmun would have been suit the spread of sealing technology from the Indussides there is the usual Harappan animal motif with Lothal

ment. Since none of the non-Harappan Gulf seals, however, bore inscriptions, literacy is unlikely to have played an important part in local life. Page 464

Ever since the first discovery of circular seals with Indus text in various locations around the Per sian Gulf, commentators have been puzzled with regard to the actual affinity of this conforming type, which has only rarely been encountered in the In dus Valley. They are still focusing attention on the potential of this class of objects in order to broaden our understanding of the relationship between the Indus Valley and Mesopotamia. In this respect, however, too little attention is being paid to the im Valley to the Persian Gulf, and by implication possibly also of writing and weight standards into the Dilmun culture.

Laursen's paper provides a comprehensive examination of the seals of the so-called 'Gulf Type', which date to the end of the third millennium BC. It is argued that the Gulf Type seals are of key importance to our understanding of the origin of sealing and other administrative technologies within an emerging Early Dilmun 'state'. Based on principal component analysis it was demonstrated that the shape of Gulf Type seals with inscriptions in Indus characters is distinct from seals without inscriptions. It is further argued that Gulf Type seals found in the Indus Valley, Iran, Mesopotamia and Bahrain can be connected with relatively discrete morphological groups apparently corresponding to different areas of production. The Indus inscriptions on the seals were investigated with particular emphasis on the abnormal occurrence of prefixed 'twins' signs in the western inscriptions. The hypothesis that a language different from that of the Harappans was used on these seals was reconfirmed on the basis of a newly found seal with a particular instructive pseudo-inscription. The

paper concludes that breakaway Harappans operating in the western orbit invented the Gulf Type seals but that the type from around 2050 BC became practically synonymous with the merchant communities in Dilmun, disconnected with the Indus Valley.

The Raw Material: Steatite is the main raw material for crafting the Harappan seals.There were many sources from which the Indus people could have obtained steatite but the main source was in the Indo-Iranian borderlands, and these had been exploited for many thousands of years by the people of ancient Pakistan and Iran, extending to 7th millennium BC. Some Indian archaeologists point to

impression-making seals. In

Central India as the possible source

1993, Mackay published 10

of steatite for the Indus people but

this opinion seems to be erroneous,different types of seals at

if not outright absurd: why would the

Mohenjodaro: square with

Indus people switch from a

perforated boss on reverse,

source that was intimately known to

them and their ancestors millenniasquare with no boss and

ago, the source which they exten

frequently inscribed on both

sively exploited since the 7th mil

lennium BC, to a source in an areasides, rectangular without boss, which was completely unknown towith linear button

them and to their ancestors? There

designs, rectangular with is no archaeological evidence for

any trade route between the Indus

perforated convex back,

Valley and the region east of the

cube, round with perforated

Thar Desert during the Harappan

boss, rectangular withCivilization or prior to it. On the other hand, the trade and pastoralperforated boss, round with

migration routes to Iran and Turan

no boss and inscribed on

were well established from the very

both sides. early days of human settlement in

Baluchistan.
Seal-making

The square seals usually

Techniques:

Seal-making techniques werehave a line of script along

more-or-less the same as those

used by the Harappan lapidaries.the top of the seal and a Thecarved animal in the central

more durable and one workshop at Chanhu-daro seems to have been engaged in the production of beads and seals side by side (6). If steatite is subjected to heat, it is slightly hardened to about 4 on the Mohs' scale. This was often done since it makes the seals wear better. The seals were also often glazed white, apparently to make their outer surfaces a uniform color, improving their luster and beauty. The following description of the steps in making a square steatite Indus stamp seal is taken from Mackay's observations.

"The steatite was first sawn into blanks of the approximate size and shape of the seal, including the thickness needed to accommodate the boss. A rough boss was then cut. This was done with four saw cuts parallel to the face of the seal. These flats were then removed by taking four additional cuts at right angles, at the edge of the reversed hump of the boss. We know from examples form Chanhudaro that the boss was left in an unfinished state while the seal itself was smoothed of saw marks and

prepared for cutting.

Indus Seals!


A group of Indus seals with animal motif. When impressed on a plastic material,

A group of Indus seals with animal motif. When impressed on a

such as clay, these seal would create a ‘positive’ impression of raised inscription plastic material, such as clay, these seal would create a **and animal motif. Not all Indus seals are of this nature; some are ‘positive’ and,**
if im- pressed on a plastic material, would create a ‘negative’ image. Such ‘seals’

‘positive’ impression of raised inscription and animal motif. Not **are thought to be amulets rather than seals**
all Indus seals are of this nature; some are ‘positive’ and, if im

pressed on a plastic material, would create a ‘negative’ image.

portion. The

nation of reductive and pyrotechnological tech

depicted on the seals,
usually

niques. The seals were cut using copper or special

males,
stone tools and carved with "thin-pointed copperinclude

bronze chisels" (5). The whitish outer surface (re

domestic and wild animals

ferred to as "glazed") is thought to be the result of

as well as mythicalsoaking the prepared seals in a chemical solution creatures such as theand subjecting them to heat, possibly in kilns, per

haps as high as 1,000 degrees centigrade. This

unicorn. Some seals contain

technique hardened the stone, making the seal

animals

Indus seals are fairly uniform and involved a combi
Such 'seals' are thought to be amulets rather than seals.The animal or other devices below the script

was the first carving on a seal. We know from Chanhu-daro examples that the design was roughed out on the surface with a sharp point. Some unfinished seals were covered with a thick coating of red ocher, the purpose of which is not yet known. Various devices were completely carved and finished as a single operation, before even roughing out the inscription was undertaken. The inscription was then carved and the back of the seal

more complex iconographic scenes that represent[340] mythological or religious events. The smaller seals could have been hung from



Indus Seals! over the seal surface it would appear that as a rule the representations were carved first Ancient Pakistan - An Archaeological History and that the signs were added only after this had been completed, preferably on the

and the boss were then finished. The boss was carved to a rounded shape and a deep V was carved along the length at right angles to the perforation, which was done next. This was a most often a two-step drilling operation, which was usually angled slightly down into the body of the seal from

Indus Seals!


Indus Seals

Animal Motifs

opposite sides of the boss. As a
links between these sites
and the larger urban final step, the
centers. seal was coated
Other with a mixture of appearing on seals found
primarily at the largest sites steatite dust
include dangerous wild
animals like the rhinoceros, mixed with water the crocodile and the tiger. baked, The one-horned rhinoceros
was fusing the coating
common in the marshlands

along the Indus river and its and hardening the steatite body of the seal itself" (7).

The vast majority of stamp seals from the Indus Valley Civilization represent a single animal, usually in profile, accompanied by some script. Less frequently we find two– or three- headed bovines, composite animals **Indus seals with elephant motif.**
combination. Furthermore, whirling compositions in which animals,

Several seals of this nature have has had


a pro
or only their heads, are incorporated, shamanistic

been found at major Harappan tributaries. Rhinoceros seals often show the animal feeding found and wide representations of animals, scenes in which a tiger
from a troughlike container with script across the top of the
looks back over his shoulder at a man perched in a
seal but rhinoceros seals without feeding trough are also

common. It is unlikely that the rhinoceros was ever tamed, and most scholars interpret the feeding trough as a symbol of respect or ritual offering to the sacred animal.

Water buffalo is yet another common theme. When appearing alone on a seal, the water buffalo usually has its head held high as if testing the air with its flared nostrils. For both wild and domestic water buffalo, this posture is characteristic of a defensive stance when protecting the herd or when courting females. Like the bull motif, the

male water buffalo may have represented fertility and protection. The wide, spreading horns with grooves or ridges are quite distinctive from those of the bull, and many of the headdresses seen on human figures depict these water buffalo horns.

Two varieties of crocodile are depicted on Indus seals; the gharial has a narrow snout and the crocodile has a wider



Page 469

ranging influence semi-human,



spiky tree, or a tiger fighting a on the borderlands, almost up to Mesopotamia. The



technology of seal-making and the motifs carved on the



seals were freely

Seal impressions with rhiadopted by these
noceros motif and inscrip

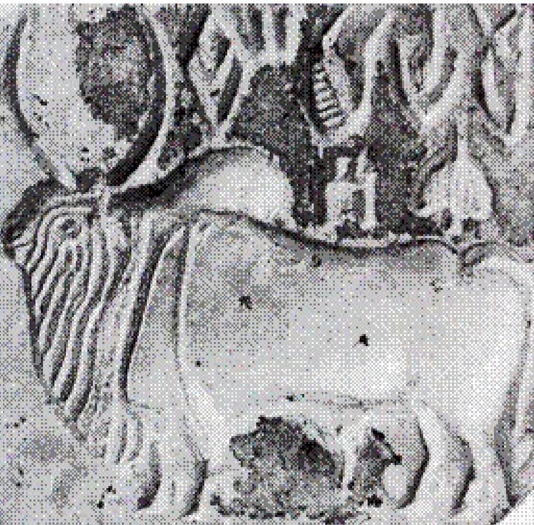
cultures although retaining the indigenous shape

Impression of an Harappan seal from Mohenjodaro,
Impression of an Harappan seal

depicting a majestic zebu with an impressive dewlap. A
number of seals with this motif but with different inscrip**from Mohenjodaro, depicting a**
tions has been found at Mohenjodaro and Harappa but
majestic zebu with an impressive

dewlap. A number of seals with
this motif but with different in

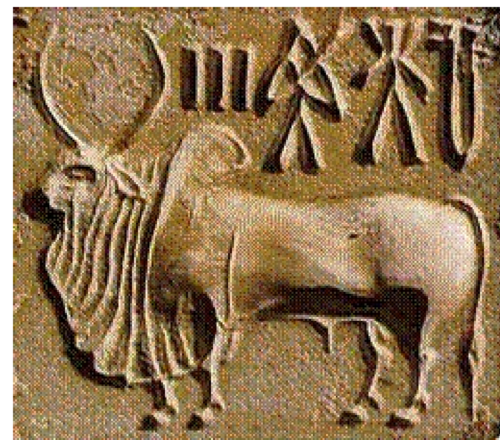
of the seals intact (8). We find quite



a few examples of the Indus motifs, even the Indus writing, on round Indussealmaking tradition

semi0bovine figure, are also found although with a low
frequency.**scriptions has been found at Mo**
henjodaro and Harappa but only seals of the Gulf The square steatite seals always have a short inscription region
and cylinalong **very few examples are known**by the

considerable irregularities in the size of the script signs drical seals of! **from other sites**



and by their sometimes almost haphazard distribution Mesopotamia and



A humpless bull with feeding trough, from Mohenjo**A humpless bull with feeding trough, from** daro (after Kenoyer)
Mohenjo-daro

upper edge of the seal, if there was still sufficient space left or else arranged in the surrounding the main composition.

The animals depicted on the seals are usually male, and most animals are carved facing left that when impressed onto animal would face to the right. The majestic zebu bull with its dewlap and wide, curving horns is perhaps the most impressive motif found on the Indus seals with relatively short inscriptions, the zebu motif is found almost exclusively at Mohenjodaro and Harappa. One example has been recovered from this may in fact have come from one of the larger centers, reflecting the strong economic and political

links between big cities and regional towns. The rarity of zebu seals at smaller or zation.peripheral sites is curious because the humped bull is a recurring theme in many of the In
ritual and decorative arts of the Indus Civilization, appearing on painted pottery and as
distinction to the engraved square seals, figurines long before the rise of cities and
faience and terra cotta tablets are produced in high
continuing on into later historical times. The
relief and have from two to four sides. Indus faience
zebu bull may symbolize the leader of the herd.
is produced from a heat-treated steatite or talc
When carved in stone, the zebu bull probably

based material that was ground and mixed with a represents the most powerful clan or somesubstance (a flux) important officials of Mohenjodaro and Harappa. that lowered the ma

terial's melting point
The short-horned, humpless bull is another fusionimportant motif on the seals, but it is not clear ifand caused upon heating. By this figure represents a wild or a domestic
animal.
exerting pressure, Short-horned and humpless species ofthe "paste" could be
cattle may have been introduced into the region,



shaped into a form whereas humped zebu are probably indigenous toby hand or pressedA seal impression with a humpless bull the Indus Valley: its bones have been found atinto a mold (9) and and the feeding troughseveral Early Indus sites in Baluchistan. hardened. Imagery



on the faience conLAHORE: Pakistani archaeologists have discovered a rare Indus Valley
civilization-era seal in steatite dating back to 2,500-2,000 BC from the The elephant is also an important symbol of power that in later historical times came to **A most recently discovered seal**sists of pictorial rep
Cholistan area of Punjab province.
The seal features the carved figure of an ibex with two pictographs. It has a**from Cholistan (at Wattowala,** be associated with royalty. Elephant seals fall in the medium size range, and like the

perforated boss on the back and varies from the style of Harappan seals. The
resenations
seal which is almost square in shape is slightly broken on the right side. The

figure of the ibex is however almost intact. The muscles, genitalia, hooves and/or **near Drawer), bearing the motif** bulk seals they are found primarily at the largest sites, Mohenjodaro and Harappa. The
and tail of the ibex were engraved artistically with a high degree of skill and script. Terracotta

craftsmanship.**of a goat (*Farzand Masih, Pun*** few examples of elephant seals found at Kalibangan and other locations reinforce the

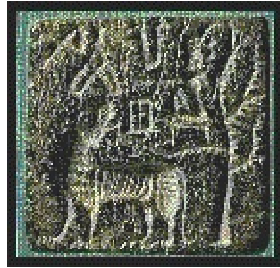
It was found at Wattoowala, located near Derawar Fort and along the ancient

bed of the Hakra river, by a six-member team of archaeologists led by ***jab University*).**

Punjab University archaeology department chairman Farzand Masih. The rare seal was found at Wattoowala, located near Derawar Fort and along the ancient bed of the Hakra river. It was discovered by a six-member team

tablets were produced by impressing a pliable clay into

A is the cylindrical seal found at Susa in western Iran. This seal clearly depicts an Indus bull with a feeding trough in feeding trough.

Page 467 western Iran.  good example

front, along with the Indus script on top of the ani

A tablet depicting a tiger interact mal motif, exactly A tablet depicting a tiger in the accepted **ing with a shamanic spirit in the**

interacting with a shamanic fashion of the **tree**

spirit in the tree Harappan Civili 

341 molds and firing them to a hardened state. Figure below discovered at Harappa is an example of a pictorial image in which a narrative theme is depicted. Seals identical to this image were found in other locations at Harappa, indicating that the same master mold was used several times. Finally, a different type of tablet was produced from steatite and incised with a sequence of signs on "blocks of steatite which were subsequently fired" (10).

Animal Motifs: The vast majority of stamp seals from the Indus Valley Civilization represent a single

animal, usually in profile, accompanied by some inscription. Less frequently we find two– or three-headed bovines, composite animals and a human-cum-tiger combination. Furthermore, whirling compositions in which animals, or only their Harappan Civilization - The Material Culture

heads, are incorporated, shamanistic representations of animals, scenes in which a tiger looks back over his shoulder at a man perched in a spiky tree, or a tiger fighting a semi-hueman, semi-bovine figure, are also found although with a low frequency.

The square steatite seals always have a short inscription along with the animal motif. Judging by the considerable irregularities in the size of the

Indus seals with elephant motif. Several seals of this nature motif on the seals, but
script signs and by their sometimes almost haphaz
have been found at major Harappan cities Indus Seals! it is not clear if this

ard distribution over the seal surface it would apfigure represents a pear that as a rule the representations were carved were probably associated wild mouth. It has been speculated that the Indus crocodiles long before the rise of cities and continuing on into later historical times.

Theshorthorned, humpless bull is another important The one-horned rhinoceros was at one time quite common in the marshlands along the Indus river and its


Indus Seals ! main composition.

or a domestic

first and that the signs were added only after this goddesses as they were in later Hindu mythology, but such Short-horned
had been completed, preferably on the upper edgefrom a troughlike container with script across the top of the and humpless
of the seal, if there was still sufficient space left or seal but rhinoceros seals without feeding trough are also cies of cattle

tributaries. Rhinoceros seals often show the animal feeding animal. with water deities or river
speculations seem to be rather far fetched and rest on the spe
assumption that some elements of the Indus mythology may
else arranged in the available room surrounding the
common. It is unlikely that the rhinoceros was ever tamed,
have been introduced

still linger on in the form of modern Hindu religion. This

and most scholars interpret the feeding trough as a symbolmotif is quite rare on the square stamp seals where the

Theanimalsis depicted without any feeding trough. of respect or ritual offering to the sacred animal. whereas humped

However, depictions of the gharial are quite common on
Water buffalo is yet another common theme. When



combination.



depicted on the
seals
are
usually
molded and carved tablets where it is often shown with a
to the Indus Valley: its
male, and most
appearing alone on a seal, the water buffalo usually has its
bones have been
animals are carved
head held high as if testing the air with its flared nostrils.

Tiger seals, not very common, are found primarily at the facing left that Indus sites inFor both wild and domestic water buffalo, this posture is

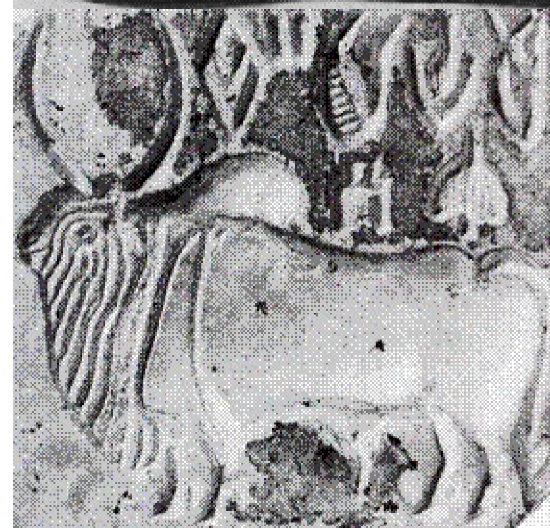
when impressed

chistan.
characteristic of a defensive stance when protecting the
When appearing alone on the square stamp seals, the tiger
herd or when courting females. Like the bull motif, the
onto a clay tag, the
is usually depicted in a formal pose; with a feeding trough
Theelephantis
male water buffalo may
face
in front and head upraised. More commonly, the tiger have represented fertility and figure is shown with other figures in different narrative
protection. The wide, spreading horns with grooves or majestic zebu bullscene, where it is generally associated with a human figure.
ridges are quite distinctive from those of the bull, and many
with its dewlap and
times came to be as
of the headdresses seen on human figures depict these semi-human,
water buffalo horns.
wide, curving horns
sociated with royalty.
Interesting are the motifs associated with the highland is perhaps the most
Elephant seals fall in
regions bordering the Indus plains: various species of
Two varieties of crocodile are depicted on Indus seals; the
impressive motif
mountain goat and sheep. One variety of wild goat, which
the medium size
range,
and like has very distinctive backward-arching horns with short
gharial has a narrow snout and the crocodile has a wider the
bulkknobs, is often confused with the ibex. Another species are

A tablet depicting a tiger interacting with a shamanic spirit in the tree

largest cities with a few examples at the smaller sites.




by the

Page 467
found on the Indus seals with relatively
Seal impressions with rhi
Seal impressions with
noceros motif and inscrip
rhinoceros motif and
inscription
A seal with a mountain goat
Indus Seals
short

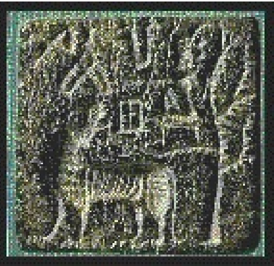
known as the *markhor* has twisted horns that spread to
inscriptions, found primarily at the
the
each side ofmotif is the head. Although not found in great
zebu mouth. It has been speculated that the Indus crocodilesfound almost exnumbers, the goat seals have been discovered at both were probably associated with water deities or river

large and small sites. Antelope or gazelle with back
goddesses as they were in later Hindu mythology, but such
Mohenjo-daro andarching or front-arching horns are also an important motif

on seals as well as on incised steatite tablets. speculations seem to be rather far fetched and rest on the at Kalibangan and
Harappa. One exassumption that some elements of the Indus mythology
ample has been otherIn addition to the above mentioned animals, there is onereinstill linger on in the form of modern Hindu religion. Thisexample of a rabbit or hare used as a motif on a square recovered from Kaforce the linksmotif is quite rare on the square stamp seals where the
libangan,is and this stamp seal from Harappa. However, many other animalstrough. crocodile depicted without tween these sites and
may
in
fact
have
common in the region were not used on the seals. The
However, depictions of the gharial are quite common on
!



peacock and other birds, monkey, squirrel, mongoose and



molded and carved tablets where it is often shown with a
onager (wild ass) are all seen in narratives or as terracotta
fish in its mouth, or shown as part of a narrative scene. Other a n i m a l

reflecting the strong
figurines, but they were never used on the square stamp
motifs appearing on
Tiger seals, not very common, are found primarily at the
economic and poseals found primarily
A seal impression with the
A seal impression with the
motof of a water bufello **motif of a water buffalo**
interacting with a shamanic spirit in the tree litical links between
largest cities with a few examples at the smaller sites.
at the largest sites In addition to the square seals with single animal motifs, several seals have two or more When appearing alone
on the square stamp seals, the tiger different animals grouped together. On a famous seal from
Mohenjodaro, a figure seated big cities and reinclude dangerous
gional towns. The in yogic position is surrounded by four animals, the elephant, the tiger, the rhinoceros
in front and head upraised. More commonly, the tiger
and the water buffalo, while two antelope are seated below his throne. Another fragment figure is
shown with other figures in different narrative
at smaller or pecrocodile and the
ripheral sites is cu
scene, where it is generally associated with a human
tiger. The one-horned
figure.
rious because the rhinoceros was at
humped
bull
is
a
one time quite com
Interesting are the motifs associated with the highland
recurring theme in
mon
in
the
marsh
regions bordering the Indus plains: various species of
many of the ritual

mountain goat and sheep. One variety of wild goat, which
lands along the Indus


and decorative arts
has very distinctive backward-arching horns with short
river and its tributar**A seal with a mountain goat** of the Indus Civiliknobs, is often confused with the ibex. Another species
ies. Rhinoceros seals **motif**known as the appearing has twisted horns that spread to
zation, often show the animal
on
each side ofpainted pottery the head. Although not found in great
feeding from a trough
and
as
figurines
numbers, the goat seals have been discovered at both
like container with

large and small sites. Antelope or gazelle with back
342arching or front-arching horns are also an important motif
on seals as well as on incised steatite tablets.

In addition to the above mentioned animals, there is one
example of a rabbit or hare used as a motif on a square



script across the top of the seal but rhinoceros seals without feeding trough are also common. It is unlikely that the rhinoceros was ever tamed, and most scholars interpret the feeding trough as a symbol of respect or ritual offering to the sacred animal.

Water buffalo is yet another common theme. When appearing alone on a seal, the water buffalo usually has its head held high as if testing the air with its flared nostrils. For both wild and domestic water buffalo, this posture is characteristic of a defensive stance when protecting the herd or when courting females. Like the bull motif, the male water buffalo may have represented fertility and protec



tion. The wide, spreading horns with grooves or

ridges are quite distinctive from those of the bull,
shrine.Unicorn figurines found at Chanhudaro, Mohenjodaro
and many of the headdresses seen on human figtelope are seated be
ures depict these water buffalo horns.and Harappa are all slightly different and must reflect localhis throne. Anartistic
traditions. The unicorns Two varieties of crocodile are depicted on

low seals fragment also of show other a

Indus seals; the gharial has a narrow snout and the considerable stylistic variation in being carved with slightly crocodile has a wider mouth. It has been speculateddifferent proportions and decorative embellishments. Even that the Indus crocodiles were probably associatedthe ritual offering stands are carved in many different ways.seal has been diswith water deities or river goddesses as they wereThese figurines and the seal motifs demonstrate that the Indus cussed in some detail

in later Hindu mythology, but such speculations in the chapter on the
people believed in this one-horned animal, and even if it turns
seem to be rather far fetched and rest on the asIndus religio.
sumption that some elements of the Indus mytholout to be only a mythical creature, it was a very important
Otherseals

ogy still linger on in the form of modern Hindu religsymbol for their elites, traders, and witch doctors. Perhapssimply combine differion. This motif is quite rare on the square stampthis animal was like the mythical animals carved onto the seals where the crocodile is depicted without any Shang bronzes in early China that guided or protected thethem in the center of feeding trough. However, depictions of the gharial owner in the real world as well as in the spirit world. the seal. The unicorn

are quite common on molded and carved tablets and the short-horned
where it is often shown with a fish in its mouth, or Always depicted in profile, this animal is indoubtedly a male shown as part of a narrative scene. bovine with a foreward-pointing smooth or ribbed horn, together as a two

Tiger seals, not very common, are found priheaded animal, and marily in the largest cities with a few examples at uptilted towards its tapering point.The face has clearly are comthe smaller sites. When appearing alone on thedelineated jowls and its muzzle is both more slender and bined with an antelope square stamp seals, the tiger is usually depicted inmore pronounced than that of the short-horned bull alsoto form a three

a formal pose; with a feeding trough in front and represented on the seals. Sometimes the face is rendered only headed animal. This
head upraised. More commonly, the tiger figure is

shown with other figures in different narrative type of composite seal has been in outline, yet other times there are a number of striations on at

scene, where it is generally associated with a huboth face and neck**.** On its shoulder the 'unicorn' always bears man figure. what is generally described as a reversed heart-shaped design, also at the site of Amri
Interesting are the motifs associated with the in Sindh. At the site of but which could equally be the frontal aspect of the animal's
highland regions bordering the Indus plains. One Kalibangan. a clay tag
variety
of

wild
goat,
which
has
very
distinctive
lungs. The 'unicorn' occasionally shares this "lung" design
was found impressed with the short-horned bull.

backward-arching horns with short knobs, is often confused with the ibex. Another species known as by a seal that has an elephant with the

the *markhor* has twisted horns that spread to eachThe unicorn motif is found at almost every site where seals horns of a bull. Some side of the head. Although not found in great numhave been recovered and even in Mesopotamian sites. At bers, the goat seals have been discovered at bothMohenjodaro, over 60 percent of the seals carry this motif, ferent

bined large and small sites. Antelope or gazelle with back- and at Harappa the unicorn is found on around 46 percent of
arching or front-arching horns are also an important the seals. Usually the head is upturned with the horn arching
fantastic figure. Made
motif on seals as well as on incised steatite tablets.

In addition to the above mentioned animals, there is one example of a rabbit or hare used as a motif on a square stamp seal from Harappa. How ever, many other animals common in the region were not used on the seals. The peacock and other birds, monkey, squirrel, mongoose and onager (wild ass) are all seen in narratives or as terracotta figu rines, but they were never used on the square stamp seals.
up of parts from each of the major animals, bull,Page 472tiger, elephant and goat, this creature has a human face and a tail from a hooded cobra. No ritual object is placed before this creature, but it is always accompanied by script. Although this

Inadditionto the square seals with single animal motifs, several seals have two or more different animals grouped together. On a famous seal from Mohenjodaro, a figure seated in yogic position is surrounded by four animals, the elephant,

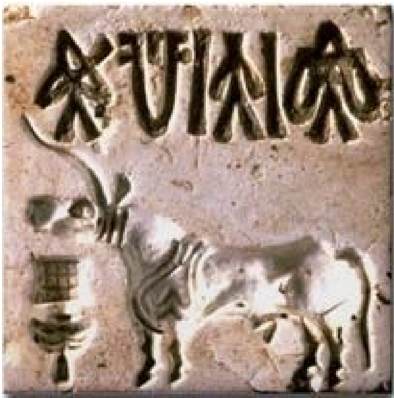
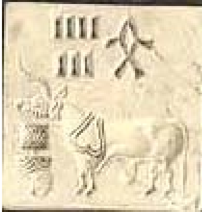


the tiger, the rhinoc



eros and the water

buffalo, while two an
on


sometimes
found

animals com
into a single

Indus Seals
343
Seals with unicorn motif





shrine.Unicorn figurines found at Chanhudaro, Mohenjodaro and Harappa are all slightly different and must reflect local artistic traditions. The unicorns on seals considerable stylistic variation in being carved with slightly

different proportions and decorative embellishments. Even

combination animal may represent various attributes merged into one creature for some special ritual or a particular shamanic effect, it could also symbolize the joining together of several clans in a commercial or political treaty. One unique example of a two-sided seal from Mohenjo-daro has the standard unicorn motif on one face and the combined-animal motif on the opposite face. Identi Indus Seals!covery of a terra cotta figurine with a single horn (6) cal script symbols are found on both faces of this lends support to the latter, though such figurines are seal. Combination animal seals found at the largest rare. Square seals at Mohenjo-daro were found in

**sites and many regional centers all depict the sameof a similar seal was found at Mohenjodaro. This seal has been discussed in some detail
basic set of animals.in the chapter on the Indus religion. more have been discovered in the lower than the**

No seal with a horse motif has been found at upper town. At the deepest levels at Mohenjo-daro, any of the Indus site, indicating the non-familiarity of the iconography, writing and style were uniform, but the Indus people with this animal. A misconceived

Other seals simply combine different animals and place them in the center of the seal.

there were changes over time that included a de

attempt has been made by two Hinduttva historians,The unicorn and the short-horned bull are often grouped together as a two-headedcrease in variability that

became "more standard

Rajaram and Jha, who attempted to show that at
ized in the upper levels" (12).

animal, and sometimes are combined with an antelope to form a three-headed animal.least one seal with a depiction of horse was in exisAlways depicted in profile, this animal is un

tence. The claim was, however, immediately de

This type of composite seal has been found at Mohenjodaro and also at the site of Amri

doubtedly a male bovine with a foreward-pointing

bunked by academic and archaeological community in Sindh. At the site of Kalibangan. a clay tag was found impressed by a seal that has an spearheaded by Witzel and Farmer (11) point.The face has clearly delineated jowls and its

Unicorn Seals:
The most common motif on

elephant with the horns of a bull. Some seals show many different animals combined

muzzle is both more slender and more pronounced

the seals is the unicorn, a mythical animal thatinto a single fantastic figure. Made up of parts from each of the major animals, bull,

Greek and Roman sources trace back to the Indian
on the seals. Sometimes the face is rendered only

tiger, elephant and goat, this creature has a human face and a tail from a hooded cobra.subcontinent. Although no actual bones of a unicorn in outline, yet other times there are a number of

have ever been found, the Indus people did con

No ritual object is placed before this creature, but it is always accompanied by script.

striations on both face and neck. On its shoulder the

ceive of this animal as a concrete reality and evenAlthough this combination animal may represent various attributes merged into one made small clay figurines that could be set on a as a reversed heart-shaped design, but which could

pole or placed in a shrine. Unicorn figurines found

creature for some special ritual or a particular shamanic effect, it could also symbolize

equally be the frontal aspect of the animal's lungs.

at Chanhu-daro, Mohenjo-daro and Harappa are allthe joining together of several clans in a commercial or political treaty. One uniqueThe 'unicorn' occasionally shares this "lung" design

slightly different and must reflect local artistic tradi
with the short-horned bull.

example of a two-sided seal from Mohenjodaro has the standard unicorn motif on onetions. The unicorns on seals also show considerIn a zoological study Grigson (13) makes the

able stylistic variation in being carved with slightly

face and the combined-animal motif on the opposite face. Identical script symbols are

point That the 'unicorn' does not represent a bovine

differentfound on both faces of this seal. Combination animal seals found at the largest sites and

ments. Even the ritual offering stands are carved in cutters. She stresses the point that the seals give

many regional centers all depict the same basic set of animals.

many different ways. These figurines and the seal the impression of something copied repeatedly in motifs demonstrate that the Indus people believed the absence of the original model. This point was in this one-horned animal, and even if it turns out to

No seal with a horse motif has been found at any of the Indus site, indicating the

non

also obliquely made by Mackay as early as 1931.

be only a mythical creature, it was a very importantfamiliarity of the Indus people with this animal. A misconceived attempt has been made symbol for their elites, traders, and witch doctors. attention to the fact that a row of bovines carved on

Perhaps this animal was like the mythical animals

by two Hinduttva historians, Rajaram and Jha, who attempted to show that at least one

a seal of Near Eastern provenance closely resem

carved onto the Shang bronzes in early China thatseal with a depiction of horse was in existence. The claim was, however, immediately

guided or protected the owner in the real world as
tion from Mesopotamian contacts. He supports his

debunked by academic and archaeological community spearheaded by Witzel and

well as in the spirit world.

Farmer. Of the animals depicted at Mohenjo-daro,

the unicorn is the most frequent (75% of the 1,501 seals discovered there until 1938), followed by short-horn bulls, zebu, and elephant. The same frequencies are found when all known Indus stamp seals are considered (12). There is no consensus as to whether the single horn depicted on the unicorn was a stylistic convention based on the animal's profile stance or a mythical animal. The dis

hypothesis by citing that the lndus seal-cutters gen
erally endowed other animals they depicted with a masterly vitality whereas the 'unicorn' remains part

Unicorn Seals


Impressions of some typical square seals with unicorn motif, the ’insence burner’ in front and
344
inscription on top

The most common motif on the seals is the unicorn, a mythical animal that Greek and

stylized, unrealistic, almost emblematic. In spite of a masterly vitality whereas the 'unicorn' remains of the container. This interpretation, however, other animals they depicted with seems to be stemming from the general tendencies

part-stylized, unrealistic, almost emblematic. In spite of the robust evidence that is the robust evidence that is available for an Indus
Mesopotamia interaction, however, it is hard to of most Indian scholars to instinctively connect eve

available for an Indus-Mesopotamia interaction, however, it is hard to make the case
make the case which During Caspers tries to do. rything Harappan with the Aryans. Other scholars
which copied version of the one-horned bovine tradition, then the 'incense-burner', so offer varying explanations or have agreed with MarDuring Caspers tries to do. While unicorn motif is so prevalent in the Indus
While unicorn motif is so prevalent in the Indus Valintricately connected with the unicorn symbolism, is very probably a simplified version Valley, it is conspicuous by its virtual absence in Mesopotamia.
ley, it is conspicuous by its virtual absence in Mesoshall by identifying this object as an incense burner,
potamia. of a symbolic object, such as the ear of grain of the relevant periods. Indus Seals**!**with ashes dripping and the fumes rising.Incense Burner or What? **Incense Burner or What?**
The object is almost invariably placed Seals the one-horned bovine tradition, then the 'incense-burner', so carved with single animal motifs

Seals carved with single animal motifs often have specific objects intricately
connected with the unicorn symbolism, is very probably a simplified version
in front of the 'unicorn' and is rarely
placed in front of the animal. The two most common objects are theof a symbolic object, such as the
ear of grain of the relevant periods. in front of the animal. The twostand and the feeding
so-called ritual offeringThe object is almost invariably placed trough. Feeding
most common objects are the somade up of three parts, a tapering
troughs are depicted on seals in front of all varieties of animals
called ritual offering stand and thein front of the 'unicorn' and is rarely
except unicorn and may represent shallow basins with downward
feeding trough. Feeding troughs
projecting rims. Such vessels have been recovered in excavations, but
ground and pierces a hemispherical
are depicted on seals in front ofmade up of three parts, a tapering
bowl-shaped container that isshaft or column which stands on the the object known as the “ritual offering stand” placed in front of the
unicorn has not been found. animals except
sometimes held on the shaft byground and pierces a hemispherical
unicorn and may represent shal
small pin. Projecting above the bowl,
bowl-shaped container that is
The presence or absence of the ritual offering stand or feeding trough
low basins with downward proa in thethe shaft supports a square or domesometimes held on the shaft byritualistic significance jecting rims. Such vessels have
small pin. Projecting above the bowl, iconography of the Harappan Civilization. Unicorn seals always have beenshaped object. This top component is
the shaft supports a square or dome
the ritual offering stand, while the majestic bull always depicted without any cult object.
but the object known as the “ritualusually cross hatched with a grid or shaped object. This top component is a
undoubtedly


Elephant and rhinoceros are generally depicted on seals without any other object, but
offering stand” placed in front of the unicorn has notzigzag lines. The edges of the bowl usually cross hatched with a grid or
been found.
occasionally a feeding trough is placed before the animal. The short-horned and
often have tiny dots or radiating lines Representation of three types of ‘trough’ or ‘brazier’ humpless bulls almost always have a feeding trough, and the head is always lowered aszigzag lines. The edges of the bowl
The presence or absence of the ritual offering **which is often seen placed in front of the unicorn on the** if it is eating. Water buffalo are generally depicted on seals with a feeding trough, but**Harappan square seals**
stand or feeding trough undoubtedly must have
which is often seen placed in front of the unicorn on
the Harappan square seals
the head is always raised with one horn lying against the shoulder and the other raised in the
Harappan square seals
some ritualistic significance in the iconography ofeven along the top edge. a dramatic curve above the head. Tiger figures are generally without a feeding trough orthe Harappan Civilization. Unicorn seals always
without any object in front. Goats usually have their heads raised and a small branch or In the absence of an actual sample retrieved have the ritual offering stand, while the majestic bullThis apparatus may have been made from archaeological remains, and in view of theplant placed in front of them, but occasionally the area beneath the animal's headof basketry and wood, and although no full-sized examples have been preserved, aalways depicted without any cult

object. Elephant symbolic nature of the unicorn motif, the consensus contains script. Multiple-headed animals and animals depicted in narrative scenes
and rhinoceros are generally depicted on seals **miniature ivory replica was recovered in 1993 from excavations at Harappa. This object** usually do not have a ritual offering stand or trough. has a cylindrical top portion with diagonal cross hatching and a hemispherical lower is growing that the object itself could be a symbol without any other object, but occasionally a feedinghas a cylindrical top portion with diagonal cross hatching and a hemispherical lower trough is placed before the animal. The shortbasin with circles incised around the entire body. The shaft extending from the base is rather than a concrete reality. According to During
basin with circles incised around the entire body. The shaft extending from the base is
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identified this object as an incense burner or sacred brazier, but some other scholars
feeding trough, and the head is always lowered as if
have disagreed. Mahadevan identifies this object as a filter for the preparation of a
Caspers, if it can be agreed that the Indus Valley
'unicorn' can be viewed as a watered-down, much it is eating. Water buffalo are generally depicted on The ritual offering stand was not only used on seals in conjunction with the unicorn but beverage called soma, which was used in Vedic rituals. The wavy lines and dots along re-copied version of the one-horned bovine tradi
The ritual offering stand was not only used on seals in conjunction with the unicorn but
also was carried in processions with the unicorn standard. It also is depicted without any seals with athe bottom of the bowl-shaped lower portion have been interpreted as liquid spilling out tion, then the 'incense-burner', so intricately con
associated unicorn symbol; on molded faience tablets as well as on incised steatite
but the head is always raised
also was carried in processions with the unicorn standard. It also is depicted without any
of the container. This interpretation, however, seems to be stemming from the general
with one horn lying against
associated unicorn symbol; on molded faience tablets as well as on incised steatite
tendencies of most Indian scholars to instinctively connect everything Harappan with

the shoulder and the other the Aryans. Other scholars offer varying explanations or have agree with Marshall by
raised in a dramatic curveidentifying this object as an incense burner, with ashes dripping and the fumes rising.

above the head. Tiger figures
In the absence of an actual sample retrieved from archaeological remains, and in view of

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have their heads raised and a

small branch or plant placed in front of them, but occasionally the area beneath the animal's head contains script. Multiple-headed animals and animals depicted in narrative scenes usually do not have a ritual offering stand or trough.

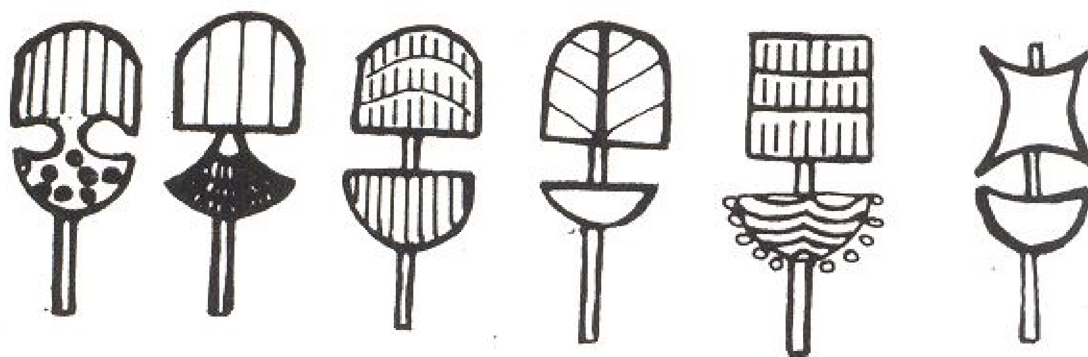
The so-called ‘offering stand’ has been the The mysterious object in front of the unicorn on the Indus seals comes in several shapes and subject
of
much
speculation.
Sir
John
Marshall
the ear of grain of the relevant periods. configuration: the above schematics are a few of them

originally identified this object as an incense burner or sacred brazier, but some other scholars have disagreed. Mahadevan identifies this object as a filter for the preparation of a beverage called soma, which was used in Vedic rituals. The wavy lines and dots along the bottom of the bowl-shaped lower portion have been interpreted as liquid spilling out

The object is rarely associated with any other animal. It is made up of three parts, a tapering shaft

Page 475 or column which stands on the ground and pierces a hemispherical bowl-shaped container that is sometimes held on the shaft by a small pin. Projecting above the bowl, the shaft supports a square or dome- shaped object. This top component is usually cross hatched with a grid or zigzag lines. The edges

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The mysterious object in front of the unicorn on the Indus seals comes in several shapes and

The mysterious object in front of the unicorn on the Indus seals comes in several

configuration: the above schematics are a few of them

nected with the unicorn symbolism, is very probably
Page 475a simplified version of a symbolic object, such as

of the bowl often have tiny dots or radiating lines along the bottom edge and sometimes even along the top edge.

This apparatus may have been made of basketry and wood, and although no full-sized examples have been preserved, a miniature ivory replica was recovered in 1993 from excavations at Harappa. This

object has a cylindrical top portion with diagonal cross hatching and a hemispherical lower basin with circles incised around the entire body. The shaft extending from the base is broken.

The ritual offering stand was not only used on seals in conjunction with the unicorn but also was Indus Seals!carried in processions with the unicorn standard. It also is depicted without any associated unicorn lablets. After the end of the Indus Civilization, this object and feeding tough disappear symbol; on molded faience tablets as well as on from the art and ritual iconography of later times, so it is unlikely that we will ever be incised steatite lablets. After the end of the Indus

able to understand their function fully. However, they do represent a unifying set of Civilization, this object and feeding tough disappear symbols that were depicted on seals and tablets throughout the Indus region. from the art and ritual iconography of later times, so it is unlikely that we will ever be able to understand their function fully. However, they do represent a unifying set of symbols that were depicted on seals

One is struck by the number of scenes in which attitudes or acts of adoration, sacrifice, and tablets throughout the Indus region.and of particular bravery occur. Equally interesting are the seals and the tablets which**Devotional or Narrative Scenes:** One istend to convey the central theme of a myth or the folklore which was apparently wellstruck by the number of scenes in which attitudes or known to the common masses. One of the finest examples of this phenomenon wasacts of adoration, sacrifice, and of particular bravery found in the VS area at Mohenjodaro. Here we see a central figure in what appears to beoccur. Equally interesting are the seals and the taba dancing person on a platform. Below and on either side two men kneel, facing him,lets which tend to convey the central theme of awhile behind both are great cobras poised like canopies above their suppliant forms. Anmyth or the folklore which was apparently well- extraordinary central figure of similar type was found in the so-called lower city atknown to the common masses. One of the finest

Mohenjodaro. This shows what appears to be a deity
examples of this phenomenon was found in the VS
(or a shaman) wearing a buffalo horn headdress,
area at Mohenjo-daro. Here we see a central figure
numerous bangles, bracelets, and a V-shaped collar or
in what appears to be a dancing person on a plat
necklace. His face is furrowed or painted, and he is in
form. Below and on either side two men kneel, fac
the same attitude as the figure in the previous seal. On
ing him, while behind both are great cobras poised
either side, however, are wild animals - a rhino and alike canopies above their suppliant forms. An ex
buffalo on the right, an elephant and a tiger to the left.
traordinary central figure of similar type was found
A hyena figure appears just above the tiger, while
in the so-called lower city at Mohenjo-daro. This below the platform
a goat looks up. This figure also

shows what appears to be a deity (or a shaman) occurs by itself. An unusual example seems to show the wearing a buffalo horn headdress, numerous bansame individual looking upward. Some of these motifs gles, bracelets, and a V-shaped collar or necklace. are discussed in the chapter on the Indus religion.

ani
to the
holding two

 Molded terracotta tablet with a narrative scene of a man in
Molded terracotta tablet with a narrative scene of a a tree with a tiger looking back over its shoulder. It probably
man in a tree with a tiger looking back over its shoulder.
relate to a popular story or perhaps depicts a shaman com
It probably relate to a popular story or perhaps depicts
municating with a tiger. The tablet, found on the west side
a shaman communicating with a tiger. The tablet, found
of Mound E at Harappa, is broken, but was made with the

on the west side of Mound E at Harappa, is broken, but was made with the same mold as one found on the eastern side of Mound E.

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His face is furrowed or painted, and he is in the same attitude as the figure in the previous seal. On either side, however, are wild animals - a rhino and a buffalo on the right, an elephant and a tiger to the left. A hyena figure appears just above the tiger, while below the platform a goat looks up. This figure also occurs by itself. An unusual example seems to show the same individual looking upward. Some of these motifs are further discussed in the chapter on the Indus religion.

Of considerable interest because of their similarity to the Gilgamesh motif of Mesopotamia are the tablets showing a powerful man holding two hapless tigers by the throat, as depicted before. In the same category is the scene of a horned and tailed individual who apparently has leaped from a Indus Seals**!** tree on the back of a tethered tiger. This suggests
individuals wearing masks.lablets. After the end of the Indus Civilization, this object and feeding tough disappear

A tree spirit or deity seems to have had an from the art and ritual iconography of later times, so it is unlikely that we will ever be important place in the ancient iconography. In oneable to understand their function fully. However, they do represent a unifying set of tablet from Mohenjo-daro we are witness to the ofsymbols that were depicted on seals and tablets throughout the Indus region. fering (sacrifice) of a goat by a kneeling man to a
figure who stands in the midst of a bush or tree . A Devotional or Narrative Scenes quiet row of individuals, some of whom may beOne is struck by the number of scenes in which attitudes or acts of adoration,

sacrifice, women wearing peculiar headdresses, watches theand of particular bravery occur. Equally interesting are the seals and the tablets which scene. A similar sc.ene with a ram or painted bulltend to convey the central theme of a myth or the folklore which was apparently welloccurs. Here the audience has long pigtails. In an

known to the common masses. One of the finest examples of this phenomenon was
other example a tiger turns his head to gaze at afound in the VS area at Mohenjodaro. Here we see a central figure in what appears to be
figure with a horned or feathered headdress who is
a dancing person on a platform. Below and on either side two men kneel, facing him,
also crouched in a tree. A scene of a ram before thewhile behind both are great cobras poised like canopies above their suppliant forms. An

same horned figure in his tree suggests scarce.
Greatly impressive a r e t h e s c e n e s showing two powerful figures uprooting trees while a braceleted individual stands between them. On another tablet, a seated woman is depicted, her hair rather disheveled, raises her arms in apparent

extraordinary central figure of similar type was found in the so-called lower city at



Mohenjodaro. This shows what appears to be a deity (or a shaman) wearing a buffalo horn headdress, numerous bangles, bracelets, and a V-shaped collar or necklace. His face is furrowed or painted, and he is in the same attitude as the figure in the previous seal. On either side, however, are wild animals buffalo on the right, an elephant and a tiger to the left. A hyena figure appears just above the tiger, while below the platform occurs by itself. An unusual example seems to show the same individual looking upward. Some of these motifs are discussed in the chapter on the Indus religion.

resignation, while **A seal, depicting several ani**ani
powerful



A seal, depicting several
mals and human figures, before her an armed mals and human figures, proba

man
stands
as
if
probably referring to a popu
bly referring to a popular leg
preparing to strike.
lar legend
end
Other possible

nonhuman or superOf considerable interest because human types are a figure who is part tiger and part of their similarity to the man but who wears a ram headdress and a hunter

Gilgamesh motif of Mesopo
who, with bow and arrow and horned headdress,
tamia are the tablets showing a
suggests something out of the Upper Paleolithic or man holding two Mesolithic of Europe rather than something from an
hapless tigers by the throat. In
early civilization. Hunting, indeed, seems to have
the same category is the scene of
had an important place, for we have an example of
a horned and tailed individual

a hunt in which the hunters have shot an antelope who apparently has leaped from
or deer. The beast has been hit twice, and a third a tree on the back of a tethered
hunter is aiming his arrow for the coup de grace. tiger. This suggests individuals
Another example apparently depicts the stabbing of wearing masks.
a buffalo by a courageous fellow who steps on one

Molded terracotta tablet with a narrative scene of a man in a tree with a tiger looking back over its shoulder. It probably relate to a popular story or perhaps depicts a shaman communicating with a tiger. The tablet, found on the west side of Mound E at Harappa, is broken, but was made with the same mold as one found on the eastern side of Mound E.

lowered horn while thrusting his spear home. In another case the position of the buffalo's head and the flying spear suggest that the hunter has missed and is in danger of being gored. The tiger appears in a sealing from Harappa, apparently being drummed up or serenaded by a man who carries in horizontal fashion a cylindrical drum .

Animal spirits or representatives of godlike powers are suggested in some seals, where a scorpion or insect of some kind is the central unit with tiger, elephant, buffalo, and rhino arranged right and left as in the great scene described previously. Processions of animals are known, but more intriguing

A narrative image of processing deities from Mohenjodaro. (*Ute Franke-Vogt*)

is the procession which depicts individuals carrying what appear to be standards. The central bearer carries a bull, while behind him is the cuplike emblem often seen before the bulls; before is a capped or turbaned bearer with a tassel or flag on a pole. A standard-like motif is seen, where two unicorn-like bull heads twist about on a pole which is apparently the trunk of a stylized pipal tree.

Surprisingly, few scenes pertains to the depiction of daily life of the Harappans. Similarly, for all the emphasis which must have been placed upon agriculture and animal husbandry, there is little of it found in these seal scenes. Only one scene, aside from the hunting ones, seems to depict a daily occupation. This shows some women busy gathering something near the foot of a birdfilled tree. The trays and other objects with them suggest that they might be winnowing. Additionally, there is an example or two men holding what seems to be a basket before a tree. The depiction of cattle is seemingly to emphasize the power and strength of the bull rather than the more useful products and service which are derived from cattle. Nowhere is a donkey shown, but goats and presumably sheep are occasionally illustrated.

Distribution Pattern: Indus seals are broadly distributed at both large and small Harappan settlements but are more common in larger cities, especially in Mohenjo-daro and Harappa. About 50 percent of Harappan seals have been found at Mohenjo-daro and when combined with the number from Harappa, the percentage goes up to almost 90 percent. The seals from other sites such as Chanhu-daro, Allahdino, Lothal, Kalibangan, etc are much smaller.





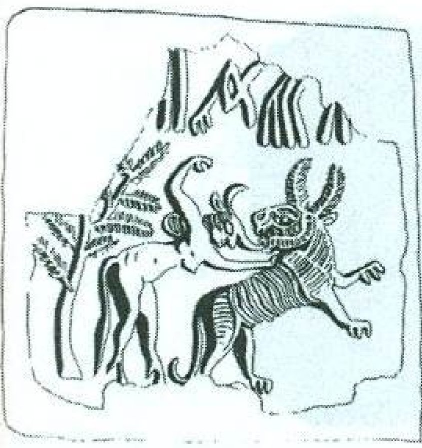
Narrative imagery from Harappa (HARP)

Although seals that traveled great distances are limited, the presence of Indus seals or motifs

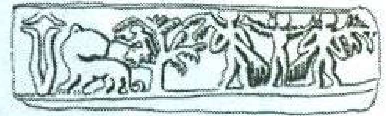
associated with them extends as far afield as Mesopotamia where sealings, lumps, or "tags" from applying a seal to a pliable material also have been found. At the site of Umma, for example, a clay lump with an impression from an intaglio seal depicting a unicorn and Indus inscription, is one such instance. Other seal impressions or seals with Indus motifs are found at sites near the Mesopotamian coast (at Ur, Lagash) and inland (at Tell Asmar), accessible on coastal and overland routes. Industype seals (some with unconvincing Indus script) have also been found in western Iran at protoElamite sites, in Central Asia, and in the coastal Arabian Peninsula. The mechanism of their spread westward has been discussed elsewhere in this book.

Function of the Indus Seals: A major question with respect to the seals and tablets is how they functioned. The most popular notion so far has been that they were somehow related to trade. The primary evidence for the use of seals as a vehicle of trade comes from Lothal. Here, over a hundred impressed clay “tags” were recovered near a large house that had burned down, thereby baking and preserving the normally unfired sealings. The most common impression is the unicorn motif, followed by the elephant motif and some swastikas. Many sealings had stamps from more than one seal, and some had four different seal impressions. The animal motif of the previous sealing was usually obliterated by the subsequent impression, but in some cases the multiple sealings appear to belong to the unicorn group, as the tip of the horn is often still this scenario, the animal probably represented a specific clan or official as a totemic identification, and with it traits, such as power, strength, wisdom, etc. which may have been associated with each animal. Following this reasoning, scholars have identified at least ten clans or communities within the Harappan trade circle: unicorn, humped bull, elephant, rhinoceros, water buffalo, short-horned humpless bull, goat, antelope, crocodile and hare. Of these the unicorn may represent the most numerous and widespread clan.

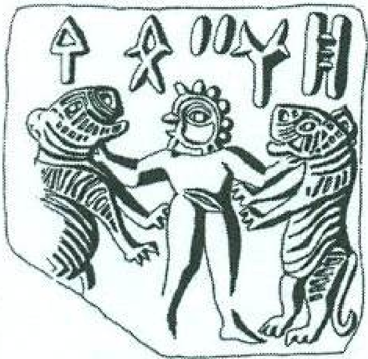
There are several reasons not to subscribe to this theory: because of the sheer number of unicorn seals it is unlikely that they all represent merchants belonging to the same clan. Still, almost all explana



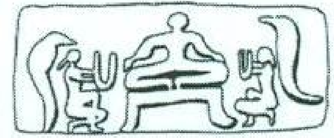












Narrative image from Mohernjo-daro (A-E, G) and Kalibangan (F) (*Ute Franke-Vogt***)**

visible along with the writing. These multiple seal ings can be interpreted in two ways that have dis similar implications for the organization of Indus trade. They may indicate that different owners were involved in a commercial transaction, but it is also possible that several officials or customs inspectors had to verify the contents of a bundle of goods be fore it could be shipped out or brought into the city.

If we assume that the Harappan seals were in fact used for sealing of goods by the merchants, then we must assume that the inscription was writ ten messages and that the significance of the animal motifs, along with the written inscription, car ried messages understandable to all the different communities living in the Indus cities. According to tions derive from this *a priori* assumption, which has in fact become an article of faith among archaeologists and anthropologists alike. The statements like this are common: "........but perhaps the most important evidence comes from numerous clay sealings from a single elephant seal that were recovered from a buried storehouse at the site of Lothal. These sealings were attached to goods that were probably being traded by a merchant or landowner who used an elephant seal, but the original seal has not been found", or speaking about the multiple animals or a composite animal on two Harappan seal one prominent archaeologists writes: ".....and both of these impressive seals may

represent a ritual or perhaps a treaty between the main clans”. !Ancient Pakistan - An Archaeological History

The argument against the use of the seals in trade more or less goes like this: If the seals were indeed an instrument of trade, then one should expect to find a large number of sealings in large cities which were in fact the centers of trade. Contrary to this expectation, Mackay has noted that in the excavations of Mohenjo-daro through 1926-1927 no seal impressions were found at all. In speaking of the corpus of impressed glyptic material from the site, he says: “It is not quite certain whether these objects should rightly be classed as seals only or as amulets, for the reason that up to the present there[th] has not been found at Mohenjo-daro a single true sealing; that is, an impression on a piece of clay or other substance that had been attached to a jar or other article of merchandise, of the kind so well known at other ancient sites, where they were fastened to the object to be sealed by means of a cord, or else they bear traces on their backs of some fabric to which they were once attached.” This lack of



A unique type of Harappan seal or amulet found at

A unique type of Harappan seal following

Gola Dhoro in Gujarat. Note the lidded compart

or amulet found at Gola Dhoro in Gujrat. Note the lidded com

data is not due to poor digging, since Mackay excavated several sites in the Near East, and he found many true seal impressions there, at Kish, for example. If seal impressions had been made at Mohenjo-daro, he would have found them there, too.

Another important observation regarding the function of the square stamp seals has to do with wear. Most of the Indus seals (not all) still retain the crisp edge of the original carving. They are unworn and clearly were not used to make many impressions, especially since the steatite from which they are

carved is the softest on the Mohs' scale of hardness, soft enough to be marked by a fingernail. Even when baked and hardened. In contrast, the cylinder seals in Mesopotamia were intensively used and were consequently carved from hard stones: agate, crystal, lapis lazuli. There are many examples of Mesopotamian seals that were heavily worn from the taking of many impressions, even some that have been recut in antiquity to rejuvenate the scene and the written message. This fits well with the large number of seal impressions that have been recovered in archaeological excavations there.

SomeIndussealshaveratherheavily abraded outside edges, especially those directly adjacent to the face, but the interior carving retains a fresh, crisp line. This pattern suggests that the seal was wrapped in cloth or worn as amulets or used for visual identification. Whatever their use, it appears from these observations that the Indus seals were not used to make huge number of impressions, which in turn suggests that they may have been used for purposes other than trade.

A second trade-related use of the Indus seal, apart from their usage as the identifier of the merchant or his clan, and which is often repeated with frequency, is that the seals were employed to identify the goods and their quantities or numbers. But, the making of seals was a laborious and lengthy process and they could not have been made on short order. Additionally, a large number of Indus seals were mass-produced by the use of standard molds. These molded seals are not only of terracotta but also of copper and faience. Now, how different merchants could use the same seal for their trading activities or how the same merchant could use the same seal to identify his various parcels or bundles, is difficult to understand. Given this situation, it is hard to imagine as to how these seals could achieve such objectives. The answer to their utility must lie somewhere else, away from the so far assumed trade activities

Some question has arisen about whether these were seals at all—there are very few sealings (the impressed clay) which have been discovered. That's definitely different from the Mesopotamian model, where the seals were clearly used as accounting devices: archaeologists have found rooms with hundreds of clay sealings all stacked and ready for counting. Further, the Indus seals don't show a lot of use-wear, compared to Mesopotamian versions. That may mean that it wasn't the seal's impression in clay that was important, but rather the seal itself that was meaningful. A large number of them are merely shallow scratches on steatite or copper tablets, a large number constitute the miniature seals or tablets, incapable of being used as seals, and an equally large number of seals and tablets are multiple copies of a single specimen, generally obtained from a master mold. Finally, a majority of the Indus seals and tablets are not carved in negateve as is generally believed but are positive inscriptions which would yield a negative image if used as a seal.

The trade-related assumption for the use of the Indus seals and tablets has been changing in recent times and a strong opinion has recently started to emerge according to which the function of the Indus seals and the writings on them was similar to amulets and they had little to do with trade, personnel or goods identification, or authority. Based on ethnographic studies, it is getting more and more evident that some of these ‘seals’ were not actually seals as they were not meant for sealing In all likelihood, the so-called Indus seals and tablets were amulets or charms to ward off evil or bring forth prosperity to the owner. The incised or molded tablets were probably kept in houses while the seals with the boss could have been worn on person, most likely around the upper arm, just like the present-day practice of wearing the *ImamZamin* in the rural communities of modern Pakistan. If this be the case, the boss at the back of the seal most likely served for keeping the seal in place, the face down, pressing on the body of the wearer. This is probably why that one observes very little wear of the seal or the hole in

the boss.

In this context, the inscription on the seal would have nothing to do with the encoded speech, they would be merely some magical marks, akin to the potter's marks. These marks, along with the picture of the carved animal, carried certain magical powers or they provided the carrier a degree of protection against some perceived dangers. Probably, each symbol represented certain blessings or invoked certain protective spirits. Certain inscribed symbols or combinations of symbols were presumably so popular that the seals with these inscriptions were mass-produced through the use of molds. According to these opinions, such inscriptions served as *taweez*, so common among the Muslims in India and in certain parts of Pakistan and Afghanistan. The inscriptions on parchments, or pieces of paper or slivers of cotton fabrics, are "writing" in one sense but they definitely neither covey any message nor encode any speech. Most of these *Taweez* are dust scribbling, some of them are not even that; they are just arithmetic numbers, arranged in certain orders and some of these arithmetic orders are common over wide geographic areas. This parallelism, of course, does not mean that the *taweez* or the *Imam-zamin* of today is an off-shoot of the Indus seal amulet but it certainly furnishes a relevant perspective for understanding the usage of the latter.

The use of the Indus seals and amulets for ritual purification, for imparting protection to the wearer, or for guaranteeing safe passage for the goods which were impressed by an appropriate seal, seems to be more probable and more in line with the wide-spread use of the 'word' in historic times within Pakistan as well as in Central Asia, Iran, and India. As Ratnagar seems to imply (15), the seals may serve for warding some specific dangers off the person wearing the seal and afford protection to the goods on which an impression of the seal was made. It could also be serving as a general charm just as was probably done by the unicorn seal.The presence of one or two examples of 'amulets' had, in fact, been noted by Mackay at Mohenjo-daro and a similar seal discovered later at Gola Dhoro in Gujarat, where the interior of the seal had been carefully hollowed out to form a compartment which was 'formerly closed by a sliding cover that fitted with grooves cut in the two sides of the seal'. Some tablets may have functioned as ritual tokens or souvenirs, not unlike the molded or inscribed amulets available at the tombs of saints or at important shrines in Pakistan today. Miniature tablets found at Harappa in large number have been recognized by Kenoyer and Meadow as amulets also.

The predominance of the unicorn motif at the largest urban centers and its widespread distribution throughout the Indus Valley and beyond also strengthens this argument. If the unicorn indicated a particular clan, it would mean that the people belonging to this clan or trading community were not only numerous, but were present in every major settlement within the Indus Valley as well as in the foreign lands. This also indicates that one particular merchant or his clan, as represented by the unicorn, would be prominent at Mohenjodaro as well as Harappa or Kalibangan. Such a scenario is, however, unlikely. On the other hand, the amulets or tokens carrying the blessed symbols and the powerful 'word' could be available on a broader scale with no limitation of ethnic mix of the people or the geographic impediments. The elite of the higher standing could use the beautifully carved square 'seals' while the common man could get his satisfaction from a molded terracotta 'seal' or a 'tablet'. In the same vein, the shamans or the witch doctors could peddle their trade with the help of copper tablets or that of molded faience.

Although the odds for the use of the Indus seals are largely in favor of non-trade applications, their use on certain type of goods should not be discounted. Just like in historic times when bottles of perfume, honey, and essential oils were sealed with lumps of clay and a seal imprint affixed to verify

the contents and protect against pilfering or tampering, one can visualize a similar use of seals in the Harappan period as well. Similarly, we must not be dogmatic in denying their use as identifier. Such a use has been very common in the whole region in the historic times when personal letters, judgments of the court, the *firmans* of the royalties, the treaties between the states, solemn agreements between individuals, and the pronouncements of high officials were affixed with the impression of seals.

Many of the tablets from Harappa were found associated with perimeter walls along with other debris. Why the tablets were discarded in this manner is a puzzle. Possibly their discard indicates a kind of '"death"' of the seal, the end of their utility, or a reflection on the owner of the tablet, their "change of status, or death, or the passing of an amount of time during which the seal was considered current" (10). The lives of seals, most likely differed depending upon the type of seal. This is akin to the strictly personalized nature of the amulets, such as Imam Zamin in the present-day Pakistan. These amulets are discarded once their purpose come to an end (for example, coming back from a long journey, the owner dies, or even when the wearer feels its noneffectiveness.

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Chapter 16

Ceramic, Stoneware, and Faience Technologies



The ceramic (pottery), stoneware, and faience technologies have one thing in common: the creative use of fire. The raw materials and the methods of production are, however, different. In the followings we attempt to review the status of these technologies and glance over the artifacts produced through these technologies.

Studies of the Indus Pottery: Studies of the Harappan Civilization have been hampered by the mass of inconsistently classified data resulting in imprecise recording in the early excavations, inconsistent definitions of terms, and uneven analyses. Pottery studies especially have been plagued by these shortcomings. This may be due in part to the generally unspectacular nature of Harappan pottery, but also in part to a curiously negative attitude on the part of some leading scholars toward the Indus Civilization as a whole (18). For example, phrases such as “stagnation and uniformity”, “monotonous regularity”, and “stifling weight of dead tradition” have been employed by Piggott (16) and repeated by later writers. Surely, if such a dim view is accepted for the civilization as whole, artifacts as mundane as pottery stand little chance of receiving objective study. In fact, due largely to the perpetuation of this unenticing stereotype, many authors have tended to discuss only the painted pottery to the exclusion of the far more numerous undecorated varieties of the ceramic repertory. But even with these authors an air of lassitude is apparent, for example, in such statements as, “the painted pottery of the Harappan Civilization is so well known that it needs little comment” (17).

Added to this common disinterest was the unfounded and longstanding belief that the Marshall-Mackay reports completely and adequately described the ceramic industry. Few specific studies have, therefore, been made of Harappan pottery. As noted by Dales (18), so uninterested have most South Asian archaeologists been in the subject that even at a major conference on Potteries in Ancient India in 1969 (20), not a single paper addressed the subject of the classification and description of Mature

Harappan pottery. The only paper promising such attention in its title, “The Harappan Ceramic Wares and the Devolution of the Harappan Culture” by S.R.Rao, begins with a statement which dampens any subsequent discussion: “We all know that the Harappan ceramic ware are uniform throughout the vast region covered by the Harappan Civilization (21).

Nevertheless,in1941thereappeareda book-length study of Harappan pottery *Indus valley painted pottery ; A comparative study of the designs on the painted wares of the Harappa culture*, by Richard F. S. Starr (1), but, as the title indicates, confining to only the painted pottery and promoting the then prevailing idea of the Indus Civilization to be merely a shadow of the west. A later attempt was the 1972 study of Harappan pottery - the doctoral thesis of Omi Manchandra (2). But it adds nothing to the basic problems. The pottery is described in an illogical mixture of ill-defined classificatory levels (18). The book can serve as a reference tool, that too only in Kalibangan and Lothal context, but is not a definitive study of the Harappan pottery industry.

Sir Mortimer Wheeler was the first Indus archaeologist to take this challenge, stating clearly the change in research attitude necessary to rectify it. “ We are at present confronted with an inchoate mass of material into which only fresh and systematic digging on modern lines can be expected to bring order. There is no doubt that the so-called uniformity of the Harappan culture in depth has been exaggerated, as to any inherent conservatism in the craftsman” (19) and it is only in 1986 that an indepth study was undertaken by Dales, Kenoyer, and Alcock, sponsored by University of Pennsylvania, and this stands the only such attempt (18). Notwithstanding that it is purely an archaeological study, the book goes a long way to address some questions regarding the Harappan pottery, taking the finds at Mohenjo-daro as examples. A few later researchers have added to this knowledge; Possehl’s exposition of the origins of Harappan pottery (33) is especially noteworthy. Similarly, Wright’s treatment of some aspects of Harappan pyrotechnology is worth mentioning (15). In this chapter, we shall summarize these studies and try to provide some background information.

An Echo of the Past: The Indus people had already made some notable progress in the shaping and firing of pottery during the early Neolithic period since the sixth, even the seventh millennium BC in Baluchistan. The art of pottery making reached a new height during the Early Harappan phase, during the fourth and third millennium BC, most notably between 3,500 BC and 2,500 BC. This accumulated knowledge passed on to the Harappan people who not only sustained the existing technologies but also made some notable improvements in them. Although they did not add anything significant to the existing body of knowledge of glazes, colors, slips, etc., their contribution to the construction of improved firing kilns was important in furthering the efficiency of ceramic production. The widespread use of bi-chamber kilns was essentially a Harappan invention.

Ceramic Technologies**!**

contemporary village near Mohenjodaro that he visited in 1930. The black color was made from a combination of dark red-brown iron oxide and black manganese. In some example, the use of organic black (condensed soot) is also suspected.

Around 2600 BC the style of painted designs included floral and geometric motifs arranged in panels beginning at the rim and extending to the lower body of the vessel. Many of these painted designs, such as the pipal leaf, the fish-scale design and intersecting-circle motifs have roots in earlier regional cultures, especially in the Early Indus period, c. 3500-2600 BC, but the combination of various motifs and style of decoration reflects a new synthesis characteristics of the Harappan

Civilization.

Early Indus—II!An Echo of the Past

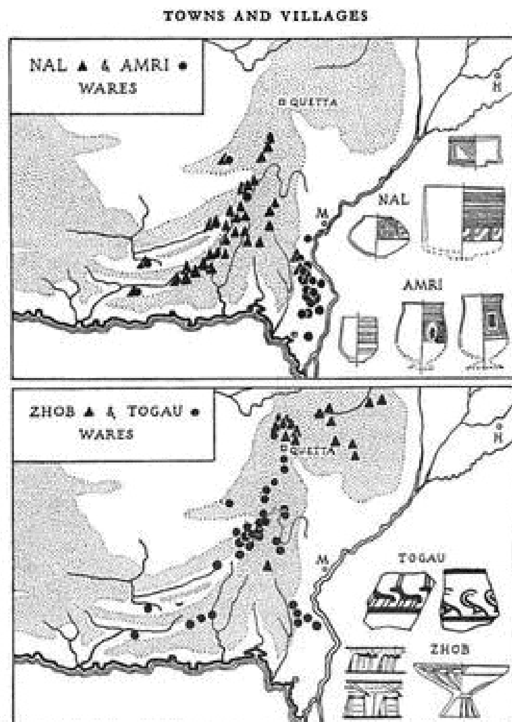


Fig. 2. Maps of village-cultures of Baluchistan.

complete the

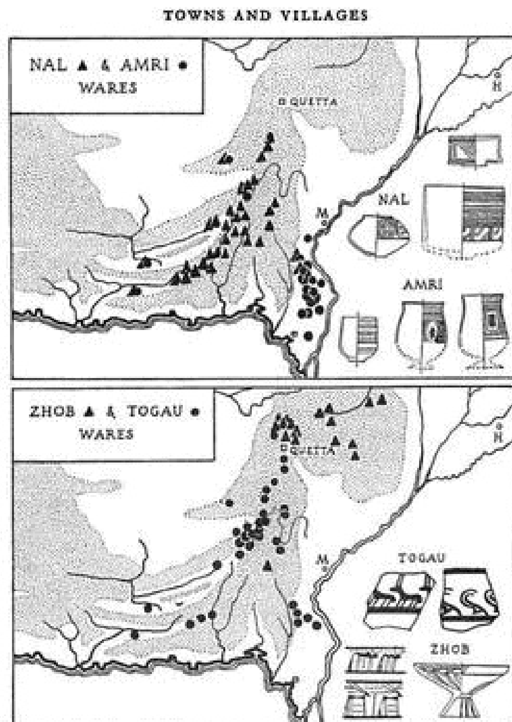
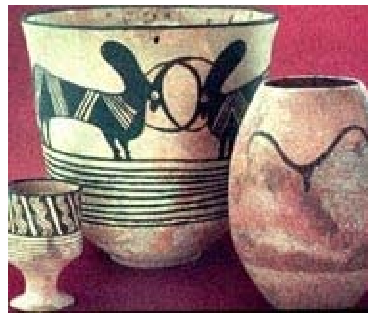


Fig. 2. Maps of village-cultures of Baluchistan.



Pottery was made in Baluchistan from about 6,000

cultural details. BC and ranged from plain everyday wares to fine sheep, goat, painted vessels decorated with a range of distinctive geometric, animal, and plant designs. The early pottery from Mehrgarh is hand formed, using a simple coiling technique in which clay body was rolled into long strong that was then pinched and beater together to form the body of a vessel. There is of

food.
The
also a basket marked ware in early Mehrgarh and Kili Gul Muhammad (the Early Settlement Period,
vetch, legume
. The calibrated
A fine example of the Early Indus c. 4500 BC) that was made by packing a lining of **Geographic Distribution of various pre-urban pottery in the Greater Indus Valley**
pottery from Sind and Baluchistan
clay inside a basket and then firing the entire assembly; the basket would burn, leaving the formed
e a r l y t h i r d

The shape pottery is narrowovoid form a disc-base;

form with a
pot intact and baked.

It appears that some sort of slow potter's wheel came into existence just when the agricultural settlements were being formed in Kachi plain and the Quetta Valley. Wheel technology is vastly expanded as these agricultural villages matured during Togau and Kechi Beg cultural phases in

almost



Nal pottery publish by John Marshall



Nal pottery associated with early Kulli levels of southern Baluchistan. These examples are from Edith Shahr Site. (after Fairservis)

Baluchistan (see *Prelude to Civilization*). The subsequent time period, the Early Indus period c. 3500-2600 BC, saw several

an inward amazingly versatile and artistic **Nal pottery from Edith Shahr, southern Baluchistan .** pottery traditions develop, of **Such superb specimen of form and decoration are not** which the Amri-Nal pottery still

met in the Maturte Harappan pottery (appeals to the eye. Thin-walled



On the left is a terracotta vessel from Bahlol Valley, Baluchistan. On the right is a Harappan vessel, decorated in
chistan. On the right is a Harappan vessel, decorated in
black-on-red. Notice the form of the vessel transmitted
black-on-red. Notice the form of the vessel transmitted
over a thousands miles distance and several centuries
over a thousands miles distance and several centuries

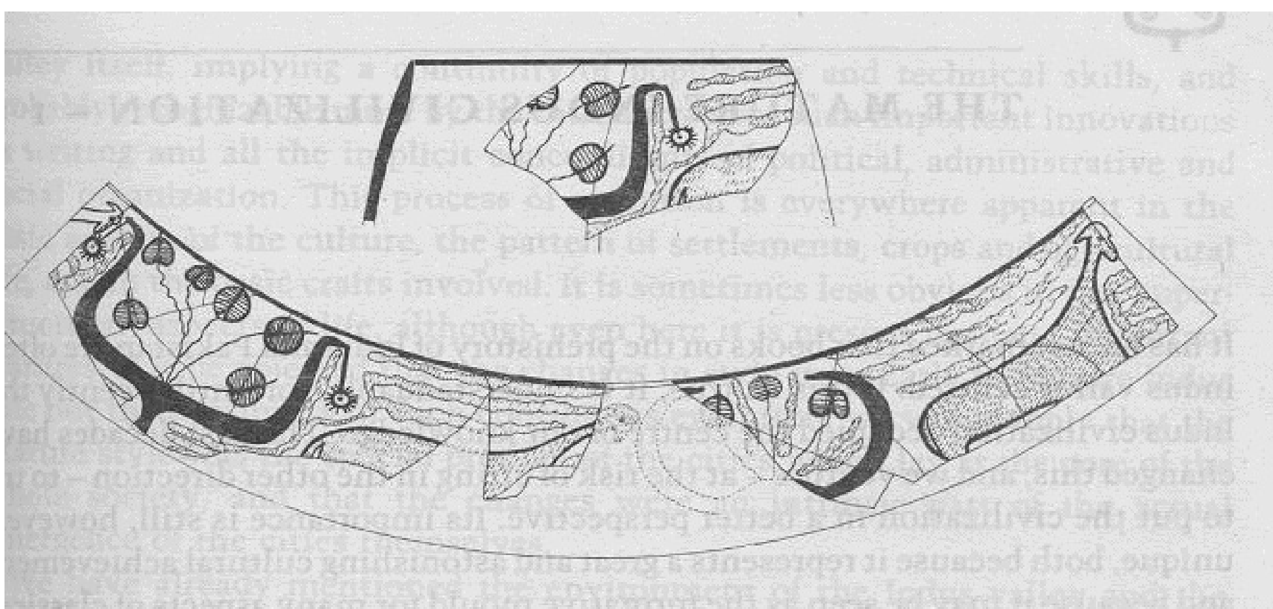
round and mouth. With the use of red, blue or yellow pigment, the painted surface is polychrome and shows repetition of motifs by multiplying their outlines in many cases. Naturalistic representations of fish and ibex occur as a motif as well. Nal pottery has been bracketed in DS I and DS II in the Quetta valley and Period IV of the

separation in time **separation in time**
Page 334 353

animals:

Jalilpur: Jalilpur is a small Punjabi village with a large Early Harappan site.Ceramic Technologies! Located 75 kilometers southwest of Harappa. The site covers an area of almostpots, elegant lines of form, high-temperature firing (both oxidative and reducing), and
Harappan Civilization - The Material Cultureabove all an array of beautiful paintings in geometric as well as curvilinear designs were 13 hectares. It was excavated by M.R.Mughal of Pakistan Department ofthe hallmark of the Baluchi pottery of the Early Indus time.
Early Indus—IIArchaeology! in 1971.
Some examples of pottery painting There was also a small

group consists of largely of(*after*



Lewan polychrome painted pot showing heads of buffalo with pipal leaf decoration (*after Allchins)*

Possehl)

delicately modeled

field season in 1975.
The material collected in

birds. Polychrome infilling ofterracotta pieces an inch or these designs include the use of
somewhat more in size. Theyellow.figures are full breasted andand
distinguished Painting in white over a black slip

Lewan polychrome painted pot showing heads of buffalo

is also known, and one of the

1963 indicated that it
had Kot Diji pottery. An
early occupation turned





red, pink,
blue **out to be of Hakra Ware. On the left is a black-on-red ware from Bakar Buthi, southern Baluchistan, representing black**

painting on red-slipped pottery of the Early Indus period. On the right is a sherd from the Since it is the only **On the left is a black-on-red ware from Bakar Buthi,**
excavated
site
Valley during the Harappan Civilization. of the **southern Baluchistan, representing black painting on**

depiction with pipal leaf decorationof This theme continues into the

red-slipped pottery of the Early Indus period. On the Mature Harappan pottery represents a blend of the ceramic traditions of the regional

Hakra Ware Phase, the right is a sherd from the Harappan Civilization, also features shared with Amri. In fact, cultures of Sind and Baluchistan on the one hand, and those of the Kulli tradition on importance of Jalilpur lies in the understanding of the Early Harappan through the other. A simplified version of this amalgam, together with the elements that favored necklaces and strands of black-on-red. This style became a hallmark of the whole

mass production, gave birth to a distinct Harappan style. However, as the pottery of the Hakra Ware Phase. The transition from Period I (Hakra Ware) to Period II (Kot **Indus Valley during the Harappan Civilization.** Harappan period shares the wheel, kiln and firing patterns with western Sind and

hair reaching to the top of the use of white paint is a hallmark

Diji) at Jalilpur is not abrupt. There is a gradual change of ceramic inventory.

painting. The Harappan pottery Baluchistan, it does not share their finest tradition in form, style, and decorative Ceramic Technologies! draws its inspiration from Sind and Baluchistan's

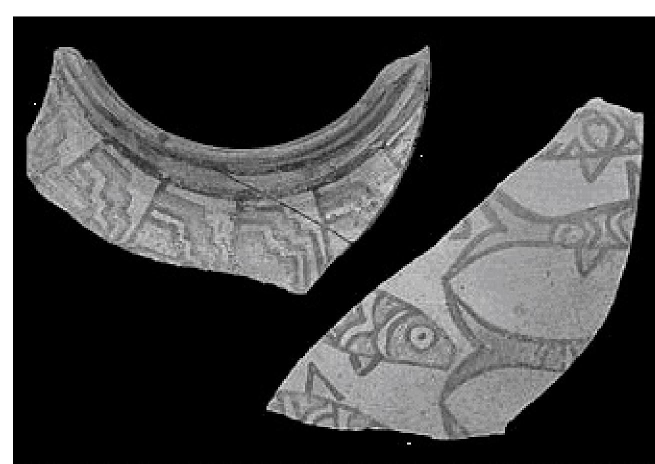
Indus Stage and are footless and end in a Page 304 rather grotesque tapering fashion. The second group of object s is that of the potters' arranged as marks. These first occur as

Polychrome Nal pottery from Niai Buthi, **Polychrome Nal pottery from Niai Buthi, Las Bela, Balu**

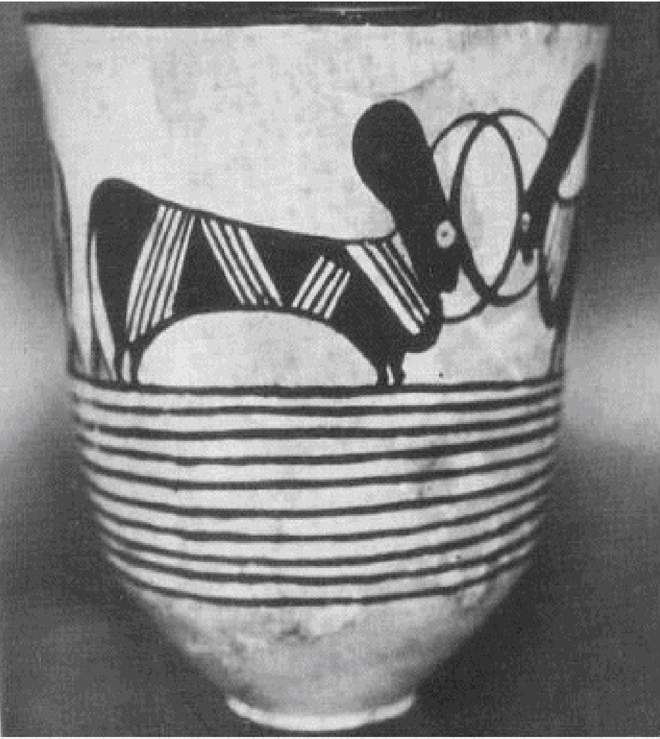
early as the first phase of thechistan. No example of such paintings have been recov

ered from the later Mature Harappan phase

Kechi Beg ware (see the



Polychrome Nal pottery from Nia Buthi, Las Bela



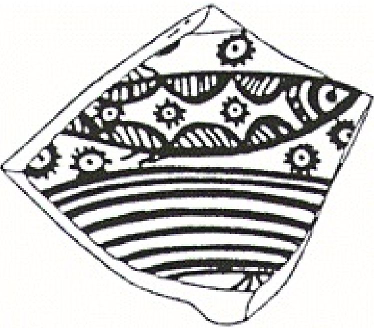
The Bull Pot in Quetta Ware from Damb Sadaat II

the breasts and made by the

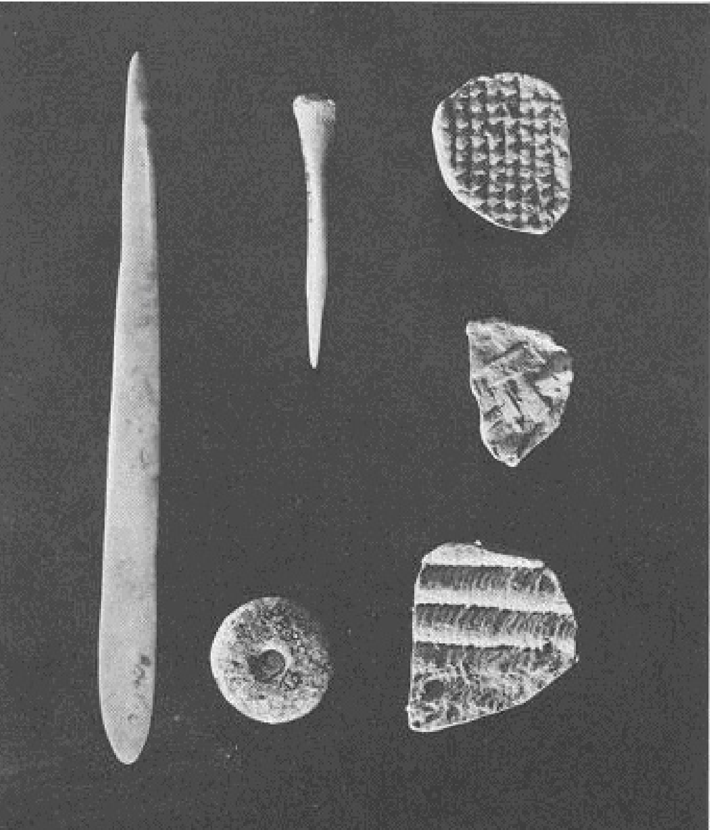
Two structures of mud brick and mud lumps were recorded in Period II. The
artistic redentions, variety, and the fineness of handicraft. Neither does it draw on the Kulli's mysterious stylistic redention although it
material inventory of Jalilpur II includes triangular terracotta cakes, toy cart does try to mimic it here and there.

appliqué methods. The legs

frames, cart wheels, human figurines, bull figurines, bangles, beads of terracotta,



are bent forward at the knee



Indications of weaving from the site of Damb Sadaat II, Quetta

(after Lee Boltin)

Fish motif on pottery in the Early Indus phase in Baluchistan and Sind (left two), and in the Ceramic Technologies! Harappan period at Harappa, Punjab, (the right most)

pots, elegant lines of form, high-temperature firing (both oxidative and reducing), and

above all an array of beautiful paintings in geometric as well as curvilinear designs were the hallmark of the Baluchi pottery of the Early Indus time.
Sherds from the Early Indus period, showing intersecting-circles design painted in black on

red, from southern Baluchistan. The same motif is repeated on an Early Indus pot from
Sherds from the Early Indus period (top) showing Harappa (bottom, left) almost 800 miles away, on a pot from the Mature Harappan phase of **intersecting-circlesdesign painted in black on red, from** Nowshahro, Sind (bottom, right) some 500 years later
southern Baluchistan. The same motif is repeated on a

The Harappans developed their own somewhat stolid character, less exciting than the Baluchi pottery of the Early Indus

times and



Chpater 6), but by this time they are very On the left is a black-on-red ware from Bakar Buthi, southern Baluchistan, representing black

painting on red-slipped pottery of the Early Indus period. On the right is a sherd from the sophisticated than



the Kulli ceramics, Harappan Civilization, also black-on-red. This style became a hallmark of the whole Indus

but is competent common. They consist of marks on the



and self-assured. It A jar from Nowshahro, Sind c.

exterior or base parts of vessel either by

Mature Harappan pottery represents a blend of the ceramic traditions of the regional 2400 BC with intersecting

means

fine wares of Amricultures of Sind and Baluchistan on the one hand, and those of the Kulli tradition on circles design. Notice the contiNal or the Quetta continuity of motif over a long disthe other. A simplified version of this amalgam, together with the elements that favored Valley

ofan tance and centuries-long separationinstrument

in
artistic

engravingmass production, gave birth to a distinct Harappan style. However, as the pottery of the Harappan period in Baluchis

in time from southern Baluchistantan as well as in Punjab sev

expression but still Harappan period shares the wheel, kiln and firing patterns with western Sind anderal centuries apart.simply by the use of the finger nails. SomeBaluchistan, it does not share their finest tradition in form, style, and decorative



painting. The Harappan pottery draws its inspiration from Sind and Baluchistan's

of the signs are quite complex and arefineness of

handicraft. Neither does it draw on the Kulli's mysterious stylistic redention although it

similar todoes try to mimic it here and there. certain signs found in the Harappan civilization script. These potters' marks are repeated not only within



successive levels within the sites excavated



but as far afield as the site of Periano

Fish motif on pottery in the Early Indus phase in Baluchistan and Sind (left two), and in the

Ghundai near Fprt Sandeman and, of course, are known for all phases of Period

Fish motif on pottery in the Early Indus phase in BaluThe Bul pot from Damb Saadat II. Such bold motifs chistan and Sind (left two), and in the Harappan period

were absent in the Mature Harappan phase IV at Mundigak, though it appears they are most common in the Quetta area. Taking a

354
Page 264
1930 and described the course of black-on-red painting.



Ancient Pakistan - An Archaeological History

The early pottery from Mehrgarh (seventh and sixth millennium BC) is hand formed, using a

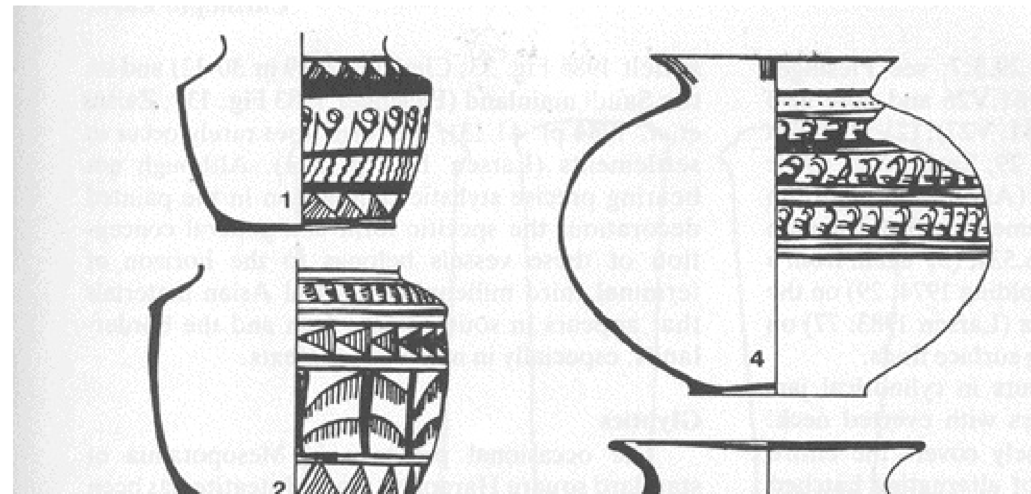


simple coiling technique in which clay body was rolled into long strong lobe that was then pinched and beaten together to form the body of a vessel. There is also a basket marked ware in early

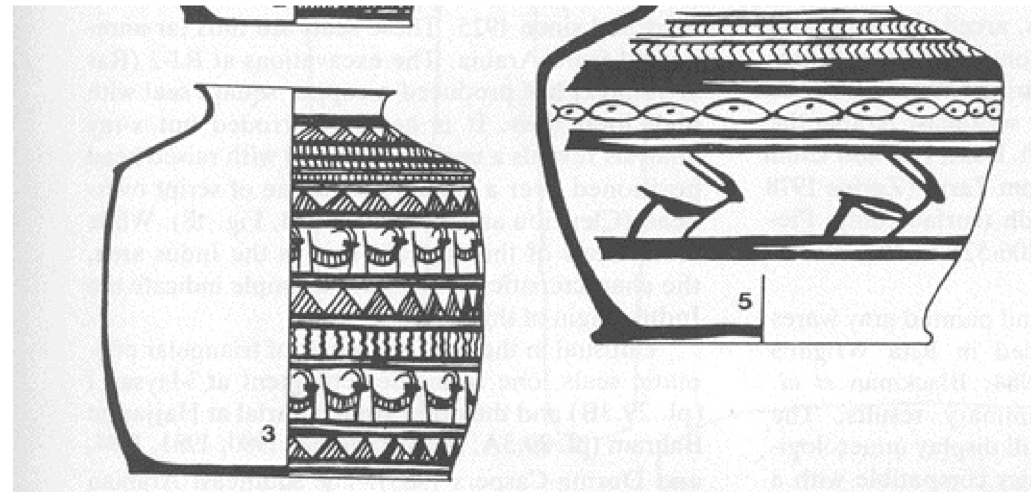


Mehrgarh and Kili Gul Muhammad in the Quetta Valley that wes made by packing a lining of clay inside a basket and then firing the entire assembly; the basket would burn, leaving the formed pot intact and baked. It appears that some sort of slow potter’s wheel (a turntable) came into existence just

Peacocks painted on pottery, from Chanhu-daro
the Harappans
common practice
that



Much of the in between these



Harappan pottery with Baluchistan motifs (after Possehl) **Harappan pottery with Baluchistan motifs (***Possehl*)

Page 350
when the agricultural settlements were being formed in Kachi plain and the Quetta Valley. Wheel technology is vastly expanded as these agricultural villages matured. The subsequent time period, the Early Harappan period *ca.* 3500-2500 BC, saw several amazingly versatile and artistic pottery traditions develop, of which the Amri-Nal pottery still appeals to the eye. Thin-walled pottery was made in Baluchistan and ranged from plain everyday wares to fine painted vessels decorated with a range of distinctive geometric, animal, and plant designs. These developments have already been

covered in Volume II (*A Prelude to Civilization*) and summarized in Chapter 5 of the present volume.

The Mature Harappan pottery draws heavily on the pottery traditions of the Early Harappan and represents a blend of the ceramic traditions of the regional cultures of Sindh and Baluchistan on the one hand, and those of the Kulli tradition on the other (see Chapter 5). A simplifyied version of this amalgam, together with the elements that favored mass production, gave birth to a distinct Harappan style. However, as the pottery of the Harappan period shares the wheel, kiln and firing patterns with western Sindh and Baluchistan, it does not share their finest tradition in form, style, and decorative painting. Although the Harappan pottery draws its inspiration from Sindh and Baluchistan's earlier tradition, it does not share its sensitivity, artistic redentions, variety, and the fineness of handicraft. Neither does it daw on the Kulli's mysterious stylistic repertoire although it does try to mimic it here and there.



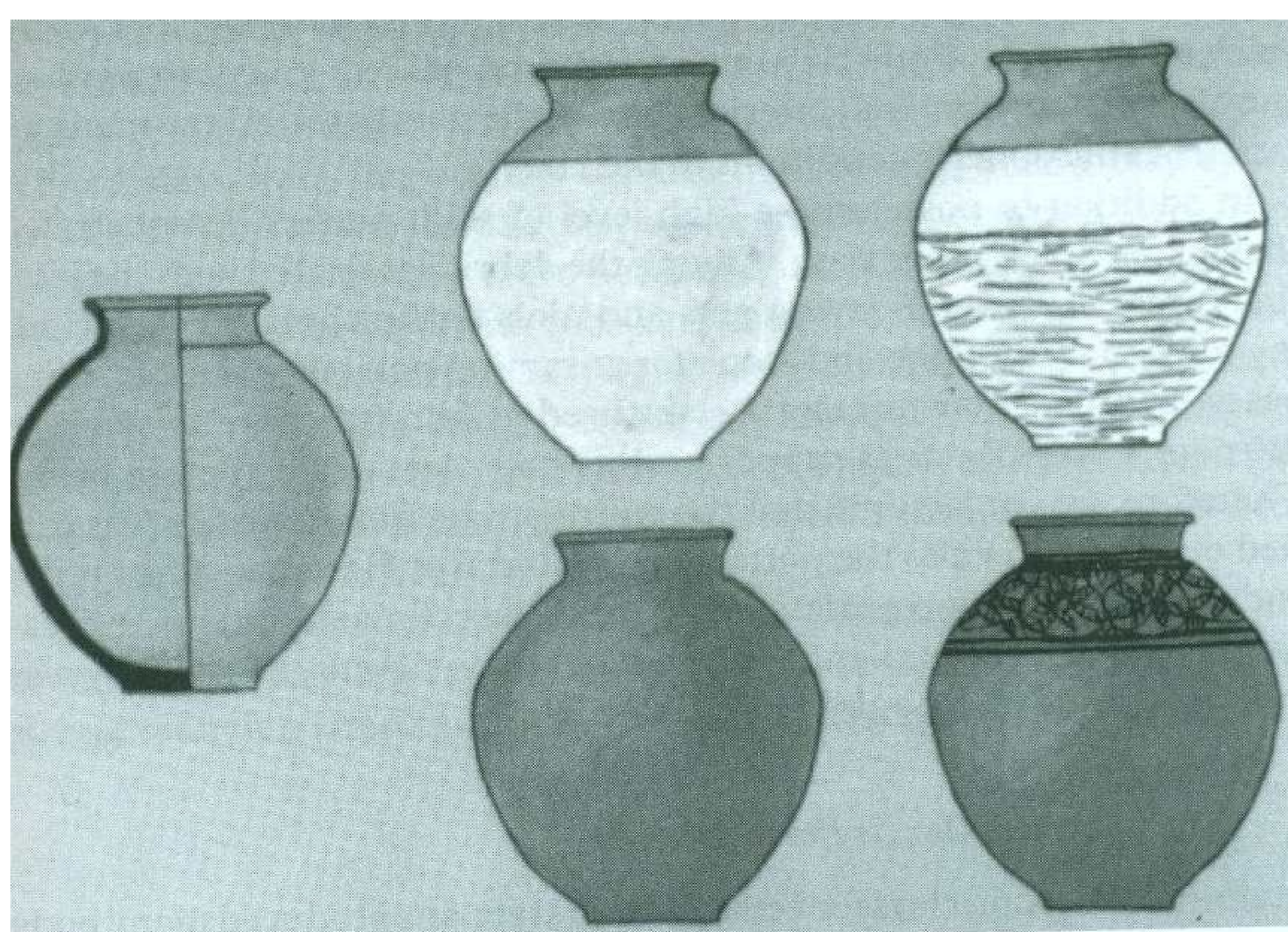
A Kot Diji period short-neck pot (top) and a polychrome pot from Mohenjo-daro (bottom). Note the similarity of form



A Kot Diji period short-neck pot (top) and a polychrome pot from Mohenjo-daro (bottom). Note the similarity of form

TheHarappansdevelopedtheirown somewhat stolid character, less exciting than the Baluchi pottery of the Early Indus times and considerably less sophisticated than the Kulli ceramics, but is competent and self-assured. It pales before the fine wares of Amri-Nal or the Quetta Valley in artistic expression but still retains some of its form and technological base. The similarity in the painting motifs as well as the identical conventions of drawing demonstrates that the Harappan painted wares are the final phase of the Baluch painted pottery tradition, much as the late Kulli is in southern Baluchistan, with which Harappan Civilization is partially contemporary. It is only simpler and rather basic.

Harappan Ceramic Technology: Ceramic technologies of the Indus cities range from relatively simple fired bricks and plain pottery to finely made wares with highly sophisticated painted fired in specialized kilns. Some of the goods, such as cooking pots, water containers, and storage vessels, were important for everyday food preparation but terracotta ornaments and ritual objects were important social symbols. Fired bricks were used in wells, drains and architecture, along with terracotta tiles, pipes and channel spouts. Aside from the common utilitarian objects, ceramic technologies of the Indus Valley included the production of low-fired plain or painted terracotta potdesigns ceramic



Harappan pottery showeing different textures and designs applied to a single form (*R.P.Wright***)**

tery and figurines, high-fired stone-ware bangles, refractory ceramics used in crucibles and kilns, and glazed faience ornaments and miniature vessels. Terracotta toys and figurines form another

major group of the Indus ceramic repertoire.

Technologically, the study of Harappan ceramics can be divided into at least four distinct groupings; terracotta, stoneware, refractory ceramics and faience. Each of these categories can be further divided into several sub-categories based on the type of objects produced (pottery, figurines, ornaments, tools, architectural components, etc.) and techniques of production (pre-firing process, temper, joining, slips, and paints, kiln condition, oxidation and reduction firing, low temperature and high temperature firing, post firing processes, etc.). We shall deal here mainly with Harappan pottery, with short notes on figurines and toys, stoneware, substitute stones, faience, and refractory material.

HARAPPAN POTTERY

The pottery of the urban phase of the Indus Civilization is generally wheel-made, often with a bright red slip. The plain types include offering stands, cups and saucers, beakers, goblets, dishes, basins, water-jars, heaters, jar-covers, ring-stands and large jars for grains. Though the plain types predominate, painted ware is not uncommon. The painted designs are in black on the dark red slip, and consist of foliated and geometrical patterns which include interlocking circles, comb, scale motifs and ‘pipal’ leaves.

Harappan pottery served a large range of purposes, as storage jars, cooking utensils, dishes and bowls, containers, strainers, etc. The cups, bowls and jars were of various shapes, some with lids, others with pronounced rims. Especially to be noted are dishes and bowls on stands, which demanded much skill from the potter. Dimensions vary from miniature containers for cosmetics to large troughs for washing clothes and feeding cattle. The use of terracotta water pipes for house drains needs also to be noted, so does the production of ‘substitute stones’ where real stones were not readily available. All in all, the potter’s art seems to have surpassed that of the mason’s, which was itself of very high caliber among the contemporary Bronze Age civilizations.

Some of the small cups were produced *en mass;* they were apparently so abundant that they were probably thrown away by those who received water from public wells: some of these wells have been found surrounded by masses of fragments of such cups. Other pottery pieces were, however, expensive enough to be kept even after being damaged, with retouching and repair. Among such finer items were pots or cups with red slips, and pots decorated with patterns and figures in black and used as storage jars and cooking. Fine pottery was often a highly valued and prestigious luxury. Harpans are, however, not particularly known for such luxuries in ceramics.

The Indus potters could have been hereditary specialists living in the same location as their ancestors and pottery-making could have been organized as a cottage industry involving men and women potters, with children as assistants. In modern Pakistan, the potter’s wheel is usually associated with male potters and mass production, but pottery-making is still organized along family lines, where women play an important role in clay preparation, the manufacture of molded and hand-formed pottery, as well as the painting and decoration of vessels.

Most painted pottery of the Indus cities was covered with a red slip and then painted with black designs, exactly in the same fashion as it is done today in the countryside of modern Pakistan, Afghanistan, and Iran. Some large storage vessels were covered on both the exterior and the interior with a black slip but contemporary examples of this technique are rare, if at all. The red color was made from red ochre (iron oxide) although there is ample evidence that the yellow ochre was also

used. This turned red on firing the pot. Mackay cites one such example of this technique in a contemporary village near Mohenjo-daro that he visited in 1930. The black color was made from a combination of dark red-brown iron some example, densed soot) is also suspected.

Around 2600 BC the style of painted designs included floral and geometric motifs arranged in panels beginning at the rim and extending to the lower body of the vessel. Many of these painted designs, such as the pipal leaf, the fish-scale design and intersecting-circle motifs have roots in earlier regional cultures, especially in the Early Harappan period, *ca*. 3500-2600 BC, but the combination of various motifs and style of decoration reflects a new synthesis characteristics of the Harappan Civilization.

Producing ceramics was one of the most basic and important utilitarian crafts. Among the over 100 different varieties of pots known from Harappan contexts, the majority were used for ordinary pursuits, for cooking, serving, eating, and bathing. Others were used for more specialized tasks, such as transport jars. Jars of this type have been discovered as distant as the Arabian Peninsula in Oman and the United Arab Emirates. Chemical analyses have shown that transport jars like these were produced in the Indus, probably at both Mohenjo-daro and Harappa (7).

The pottery types associated with the Harpans demonstrate a high level of skill. Some pot categories, like the pointed bowls, were simple wheel-made vessels. These were apparently raised from a single lump of clay (referred to as the "hump"). By establishing a rhythm through a repetition of movements, potters produced a standardized globular shape in different sizes. Their surfaces are plain and unmodified, although traces of the potter's hand are visible in the presence of thumb and other finger marks. Other pots were produced in several stages.

Natural clays were readily available in most regions of the civilization. The Harappan potters demonstrated significant skill by pushing the natural clays beyond their normal workability range. They also devised double-chambered kiln (see below). A diversity of products was created not only through the form of the vessel but also through the modification of outer surface of the pot. The examples in the above show a single form on which potters created innovative effects by applying different surface textures. Traces of the potter's hand are visible in the scraped surface of diagonal lines that are etched after covering with a cream slip or wash. This transformation of the clay surface affects a clay body that is raised in areas and slipped in around the depressions. The result is a surface that is enhanced by color and textural contrasts on which the upper surfaces of the pot are a velvety rose paste and at their midsections, a manipulated surface that highlights the deep permanent marks made in the clay.

Ceramic types became increasingly diversified during the Urban period. In contrast to the Preurban period when there was a limited range of oxide and black manganese. In

the use of organic black (conshapes and decoration with variations in localized regions, Harappan ceramics were more standardized and uniform throughout the Urban period. Over one hundred different types have been identified (8) and within each type the variations in decorative elements.

Potter’s Wheel: One of the most important device ever invented for the production of pottery is the pottery wheel and the Happans could very well be the first in the Old World to use it on a large scale. A potter's wheel is a device used in the shaping of round ceramic ware. The wheel may also be used during process of trimming the excess body from dried ware and for applying incised decoration or

rings of color. Use of potter's wheel became widespread throughout the Old World as early as fourth millennium BC.



A model of the potters' turntable that was probably used in the sixth millennium BC in the Indus Valley and the Near East

Many early ceramics were hand-built using a simple coiling techniquee in which clay was rolled into long threads that were then pinched and beaten together to form the body of a vessel. In the coiling method of construction, all of the energy required to form the main part of a piece is supplied indirectly by the hands of the potter. Early ceramics built by coiling were often placed on mats or large leaves to allow them to be worked more conveniently. The evidence of this lies in mat or leaf impressions left on the base of the pot. This arrangement allowed the potter to turn the vessel under construction, rather than walk around it to add coils of clay.

The earliest forms of the potter's wheel (tournettes or slow wheels) were probably developed as an extension to this procedure. Tournettes were turned slowly by hand while coiling a pot. Only a small range of vessels were fashioned on the tournette, suggesting that it was used by a limited number of potters. It's not known precisely where or when the first pottery wheel was invented, and it's highly probable that it was developed separately in multiple times and places. Egyptian tomb drawings from about 4,500 years ago show potters using turntables and kilns. Pottery wheels and fragments of wheels have also been found in Mesopotamia that date back over 5,000 years. In Pakistan, the invention of the pottery wheel has been derived from the evidence of the vessels produced on them, e.g. pottery ware that could be made only with a pottery wheel such as goblets with regular curves and smooth spirals. Most of the Early Indus pottery is hand-made but there are some examples at Mehrgarh and later at Nal that clearly indicate the use of a potter's wheel during the fifth millennium BC.

High Speed Spinning Wheel: While the turntable or the tournette is a great convenience, technologically it is no different than making pots by hand. The real change in technology came when the fast spinning wheel was invented and used. The fast wheel enabled a new process of pottery-making to develop, called "throwing", in which a lump of clay was placed centrally on the wheel and then squeezed, lifted and shaped as the wheel turned constantly and at relatively high speed. The process can be used to create thinner-walled pieces and a wider variety of shapes, including stemmed

vessels, so wheel-thrown pottery can be distinguished from hand-made or constructed on a slow wheel. According to George Foster (9), the essence of the invention of the fast spinning potter's wheel, and its cultural consequences, is not the elaboration of a slowly rotating platform that was hithertofore known, but the possibilities of exploiting the centrifugaI force generated by the action of a fast and continuous motion.

Since the thrown ware requires a paste more moist than most hand-made ware, the resulting object may sag during drying unless it is made heavier and thicker at the foot than desired. When leatherhard, this heavy and thick object undergoes a finishing process on the wheel whereby, with cutting instruments, it is trimmed to its final form.

Several different types of fast wheels have been developed in prehistory but two stand out. The first is a simple, heavy, wheel that operates on the flywheel principle. It utilizes energy stored in the rotating mass of the heavy stone wheel itself to speed the process. This wheel is wound up and charged with energy by pushing it with a stick or by hand to spin, providing a centrifugal force. Ethnographic studies have shown that potters generally employed a simple flywheel, the use of which has been common into recent times in India. In one common version, shown here, either a large flat stone or a wooden disc is mounted upon a pivot and spun by hand or a stick until sufficient momentum is attained. Several vessels can be shaped before the wheel slows down. Another version employs an exceedingly heavy spoked wheel resembling a cart-wheel in shape; it is spun by a loose stick inserted in a slot near the rim. Contrary to the



A pottery wheel traditionally popular in India. It is intermittently driven by a stick as shown below and the pot is thrown on it as long as the momentum lasts


The Wheal is rotated by a stick to give it a strong momentum

kick-wheel spinning device described byelow, where the driving and forming wheels are separate, the flywheel type of potter's wheel uses one single wheel for driving as well as forming. This drastically limits the control of the potter on the machine and renders the throwing of the pot rather cumbersome. Furthermore, the wheel tends to oscillate.

The second type is the kick-wheel depicted in the attached sketch. This wheel is characterized by two horizontal discs rigidly joined by a vertical axle, supported at the bottom by a thrust bearing (in the case of crude wheels, a depression in a stone and beneath the head by a second bearing (in earlier times, by a restraining leather strip). The wheel is usually set in a pit; the potter sits on the side of the pit and regulates the speed and duration of the movement of the wheel by kicking the lower wheel with his foot, leaving both of his hands to do the actual work.The lower wheel, in addition to serving as the source of power, functions also as a fly wheel to govern the speed and give momentum to the whole assembly. Potter's clay is centered for working on the top wheel, which often, but not always, is smaller than the bottom wheel. The double wheel revolves smoothly, constantly, with controlled speed and without oscillation.

The variations of fast rotating wheels are known over a large area of Iran and Turan as well as the Near East but its use in throwing and shaping of pots on a large scale is specific to the Harappan Civilization. In this respect, the story of the Harapan pottery essentially boils down to the use of the fast spinning wheel in the service of mass scale production of identical pots. It is difficult to say if the development of fast potter's wheel was an indigenous development or its was introduced here from outside. Naturally, if it was introduced from the west, then how and when.

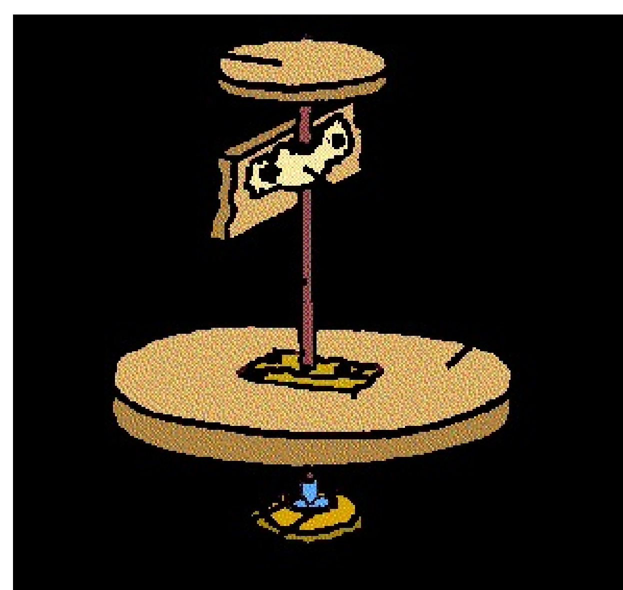
The introduction of potter's wheel to the Indus Valley is controversial. It is interesting to note the archaeological evidence coming from Iran and Mesopotamia where foot-driven potter's wheel is attested right before the flowering of the Harappan Civilization in Pakistan. Similarly, it is noteworthy that some pots originating in Baluchistan and lower Sindh in the Early Indus period were clearly wheel thrown at relatively high speed. It is, however, not known whether this fast wheel was foot-driven or it was merely a flywheel the examples of which we still find in modern India.

Some archaeologists hypothesize the indigenous development of the potter's wheel in the Quetta Valley from where its use spread not only to the Greater Indus Valley but also into Iran and beyond. Other archaeologists, however, would be content to see the emergence of potter's wheel in the Early

Harappan times, *ca.* 3500-2600 BC and not insisting on its indigenous origin. There is some relationship, although not very close, between the Harappan hand-made pottery and the pottery of eastern Iran and Baluchistan in the Early Indus time. There is a relationship, especially in painted designs, between the Quetta ware and the pottery of Alyne Depe, in central Asia during the same time. There is also some familiarity between the Kulli pottery and that of eastern Iran and it is difficult to say who influenced whom.

Foot-wheel is in common use throughout Pakistan and it closely resembles that which is found right across the border in Iran all the way to the Near East. Thus, it is very well possible that the foot-driven wheel did originate in the regional cultures of the Early Harappan era in lower Sindh and Baluchistan from where the technology diffused westward to Iran and the Near East on one hand and into Punjab on the other. The diffusion of this technology into the present day India did not take place because of the physical barrier of the Thar desert between the two geographical regions, with the result that the foot-wheel was not known in the present-day India until very recent times. As stated above, here the hand-spun wheel has been in common use.

The introduction of the potters' wheel, especially that of high speed variety, initiated a fundamental change in the Harappan economy and probably played an important role in the 'industrialization' of the Indus cities. In pre-wheel times people



A probable construction of a potter's kick-wheel thought to be common in the Indus Civilization in its urban phase. The wheel was mounted in a pit on the edge of it the potter sat and kept the

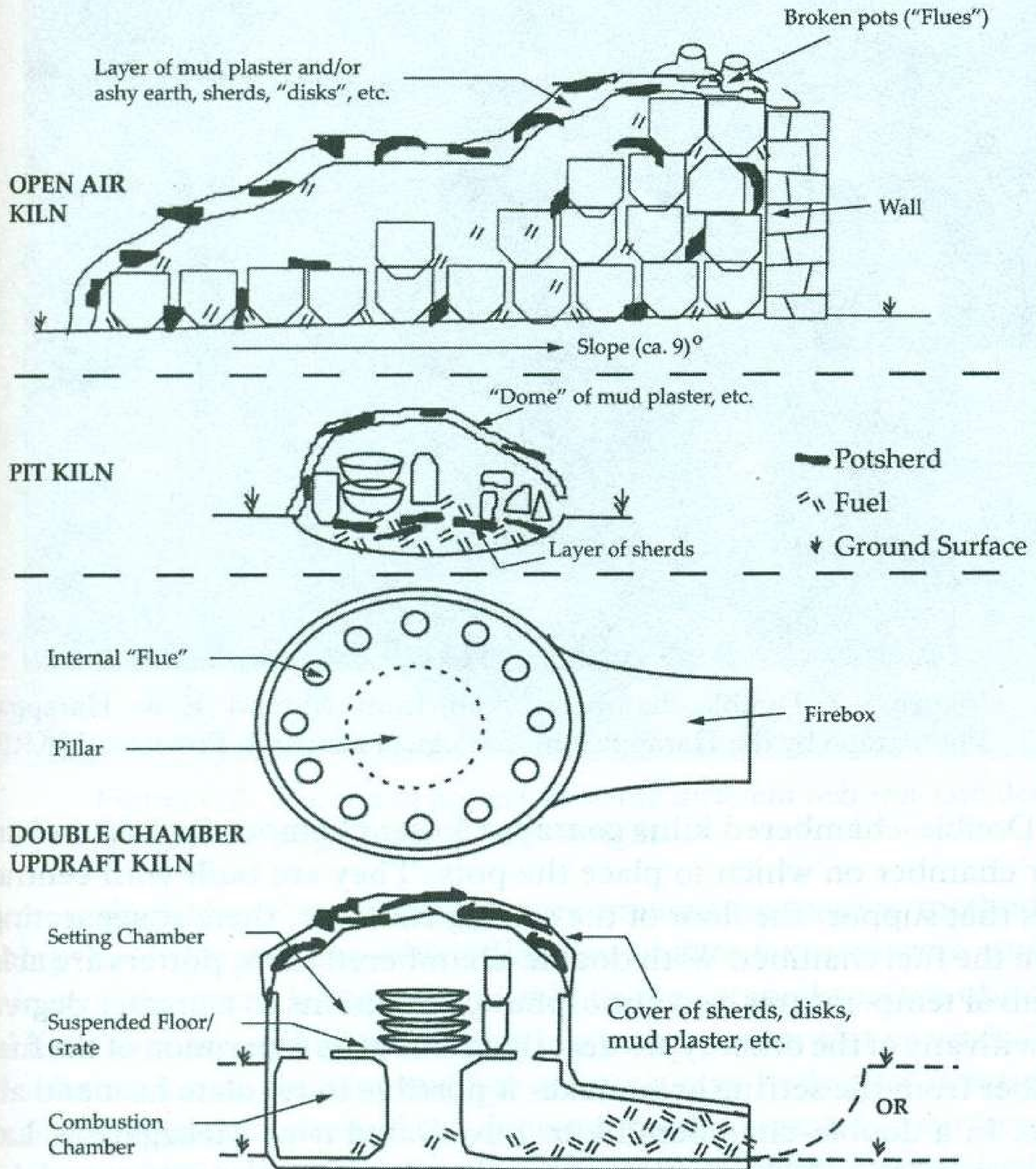
wheel in continuous motion by kicking the lower flywheel

made pots, primarily for their own domestic consumption. Pot-making techniques were laborious and time consuming, so that absolute production was strictly limited. The wheel greatly shortened the time necessary physical effort proved the quality of the ware. Full-time male specialists essentially eliminated women from pottery work, thus giving birth to a commercial industry which was in fact only a home craft before the urbanization of the Indus Valley. Greatly increased production stimulated the development of trade and markets

It must be noted that the availability of potter's wheel did not necessarily make the handmade pottery a redundant technology. A large proportion of the Harappan pottery is in fact handmade and this

technique is still in use in many parts of modern Pakistan, especially in upper Sindh and lower Punjab. There are two reasons for the surto make a vessel, reduced the

involved, and simuItaneousIy imvival of the hand-made pottery. First, it is a 'low tech' method of manufacturing; the artisan need not be highly trained as it is necessary for the use of wheel. Second, hand-made pottery allows the realization of diverse shapes and unusual ways of decoration. One of the examples from the Mature Harappan is the formation of perforated jars. Examples from modern-day Pakistan are the highly decorative pottery tradition in the Bhawalpur area.



Three different kiln types (*H.M.L.Miller*)

retard the combustion as much as possible. Then for seven days the Ancient Pakistan - An Archaeological History

Furthermore, in spite of the tremendous ad

A basic pottery firing arrangement described by Mackay in

vantages of the fast spinning wheel, the use of the
slow rotating disc continued. This is apparent from

a village of Sind. Such ‘kilns’ were common in the Early
the available archaeological evidence which shows Ceramic Technologies! Indus times (3500-2600 BC) but they continued to be

that while the use of fast wheel seems to be pre

used into very recent times throughout Pakistan and India which may be a pillar or a small wall of bricks, as slow turning wheel is equally prevalent in some areas. This trend is particularly strong in the Indus in some of the Harappan examples. This is all prepheries, such as those in the Indo-Gangetic Dicovered during firing with a dome that is usually vide and in Kutch and Saurashtra where the use of taken apart at the end of firing to access thepile is left to cool. A more primitive kiln could not
dence. contents of the upper chamber, and it is therefore a be imagined, but it can produce well-baked articles temporary part of the facility. In front of the domedforming and wheel-throwing techniques have beendouble chamber is a constricted neck, which gives capable of standing a considerable amount of

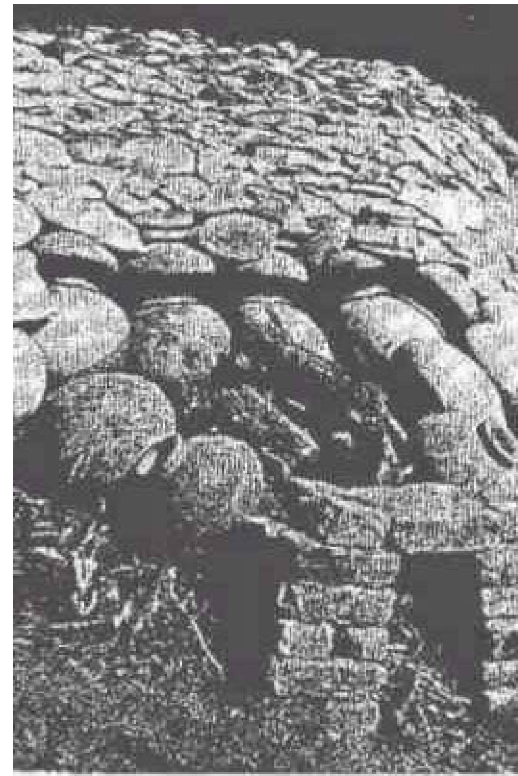
used in producing a pot. One of the most wide

spread dual method for making large vessels, utiliz the whole affair the look of a funnel when viewed knocking about. As the same piece of ground is
ing wheel as well as hand-forming, is common to on plan. This leads to lower chamber, which isused repeatedly for firing pottery, often the highestthere for several purposes. It allows the kiln to bethrow a bottomless cylindrical form, resembling a fueled and the fire stocked. It also controls thepart of the village is an artificial mound almost
this cylinder is enlarged and beaten into form withamount of air that goes to the fire and plays a role entirely composed of ash and potsherds”.

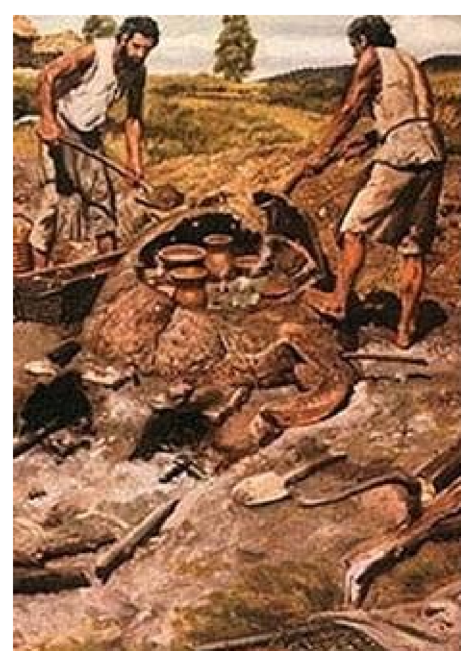
paddle and then fitted with the base and the rim.in determining the temperature and the oxidation/Although the pot is, in its initial stage, thrown, the
overall construction is hand-wrought. It is doubtful

The same kind of 'primitive kilns' have been found

reduction reaction.



that any archaeological evidence could give a clue Pottery kilns have been found scattered throughout in several parts of modern Pakistan. One such Ceramic Technologies!various mounds at Mohenjodaro, Harappa, Chanhuexample has been described by

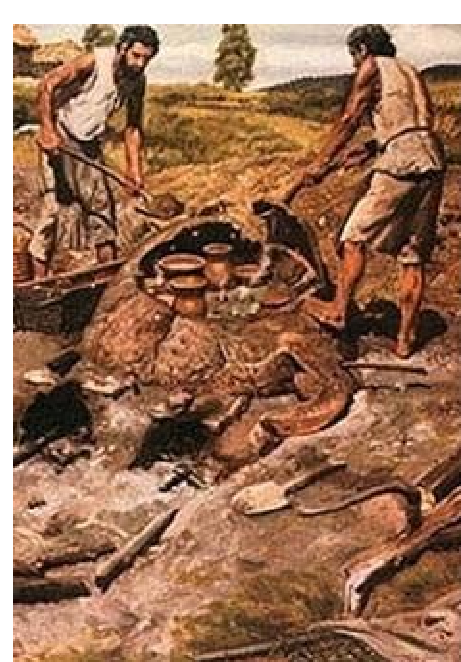


Mughal from -daro, Nausharo, Kot Diji, Balakot and Lal Shah. In Cholistan. It is assumed that same kind of which may be a pillar or a small wall of bricks, as chamber flue-fired pottery kiln. The abandoned buildings. A modern-day pottery 'kiln' in Cholistan, singlesome pottery arrangements for baking of pottery was probably

pots to be fired are piled on a perfo in some of the Harappan examples. This is all employed by the Harappans and the other Bronze

making took place in widely dispersed localities, a

covered during firing with a dome that is usually
Age civilizations of the time. However, judging
series of pottery kilns on the northwestern corner of dus type, similar to one described
taken apart at the end of firing to access the from the collective evidence from the by Mackay in a village of Sind in 1930 (after Mughal)
contents of the upper chamber, and it is therefore a



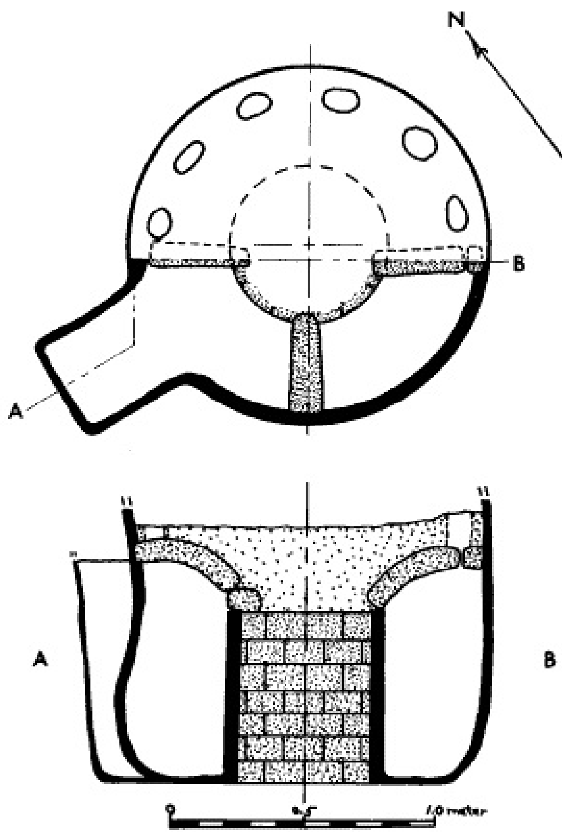
temporary part of the facility. In front of the domed Page 344double chamber is a constricted neck, which gives



the whole affair the look of a funnel when viewed on plan. This leads to lower chamber, which is there for several purposes. It allows the kiln to be fueled and the fire stocked. It also controls the amount of air that goes to the fire and plays a role in determining the temperature and the oxidation/



reduction reaction. Pottery kilns have been found scattered throughout various mounds at Mohenjodaro, Harappa, Chanhu



An artistic presentation of double

An artistic presentation of double- chamber flue-fired

chamber flue-fired pottery kiln. The

rated platform where they receive heat from the fire

pots to be fired are piled on a perfo
-daro, Nausharo, Kot Diji, Balakot and Lal Shah. In

A sketch of a kiln excavated by Dale at **A sketch of a kiln excavated by Dale at Balakot, south**

many instances the kilns had been made in old,

ern Baluchistan. It is re- markably similar in construc Balakot, southern Baluchistan. It is re

abandoned buildings. markably similar in construction as those tion as those reported by Fairservis in Quetta Valley and some pottery by Kenoyer at HarappaAlthough

reported by Fairservis in Quetta Valley A large updraft kiln of the Harappan period, c.

rated platform where they receive making took place in widely dispersed

localities, a 2400 BC, found on Mound E, Harappa (after and by Kenoyer at Harappa

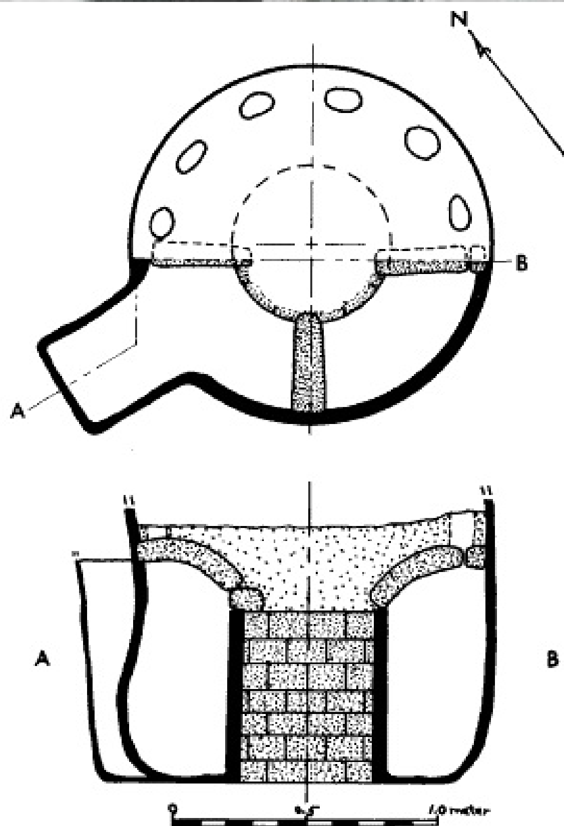
Kenoyer)

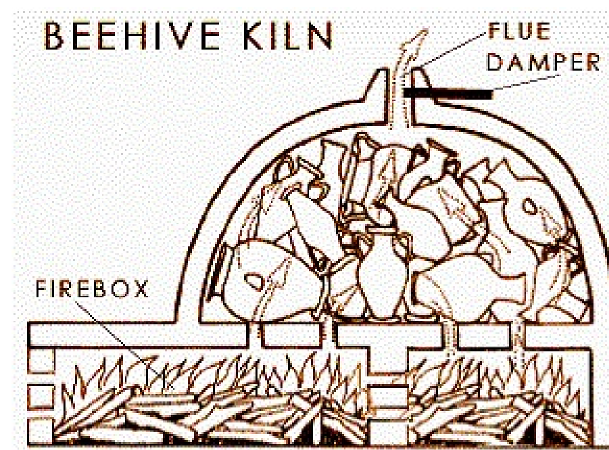
heat from the fire chamber below.
series of pottery kilns on the northwestern corner of

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Schematics of a double-chambered kiln, also known as beehive kiln. Note the central support post, several examples of which have been found at Harappa.



Part of a terra cotta kiln setter found in the Trench 54 South workshop debris. The tip is not vitrified and may have been buried in ash during the firing process

completely obliterated by the paddle and the anvil. In Bangladesh the simpIe wheel is used in an entirely different combination process. Here, the rim and upper half of a pot is wheel-thrown by a man, while the bottom half is molded over an unfired clay convex form by a woman. Then the two halves are welded together with a paddle and anvil by a male potter, but the vessel is not further enlarged, as in the more common Indian pattern.

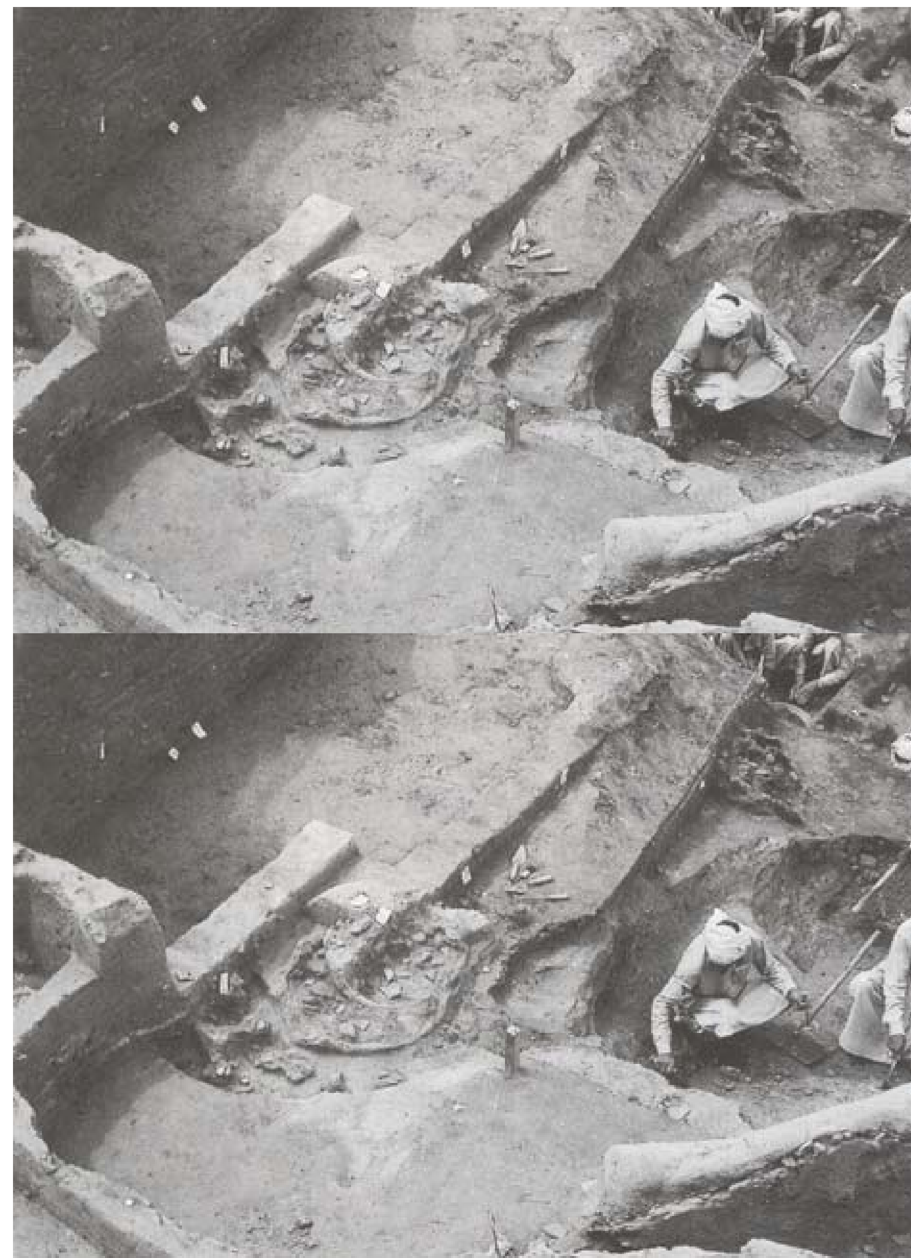
Potter’s Kiln: There are many ways to fire pottery. It is possible to fire pots or clay figurines by simply piling these objects together with some fuel and setting the heap afire. Even the crudest of these arrangements get the job done, may be not in an even, fully satisfactory way, but the heat causes some of the physical and chemical changes that transform clay to pottery. The earliest kilns were nothing more than a shallow pit dug in the ground. Pottery was loosely stacked on top of each other. Combustible materials were placed around and

362 above the pottery and the fire was allowed to burn down. After cooling, the pots were cleaned of the ash and were then used.

Pots fired in this way were very fragile and porous due to the low temperatures possible in such a firing. At this low temperature glazing is not possible. Advantages of this type of firing are its relative ease of construction and low cost. Disad vantages are the low temperature limitations and the fragility of the ware. In 1930 Mackay observed the firing of pots in a village near Mohenjo-daro. He describes this most basic arrangement as follows:

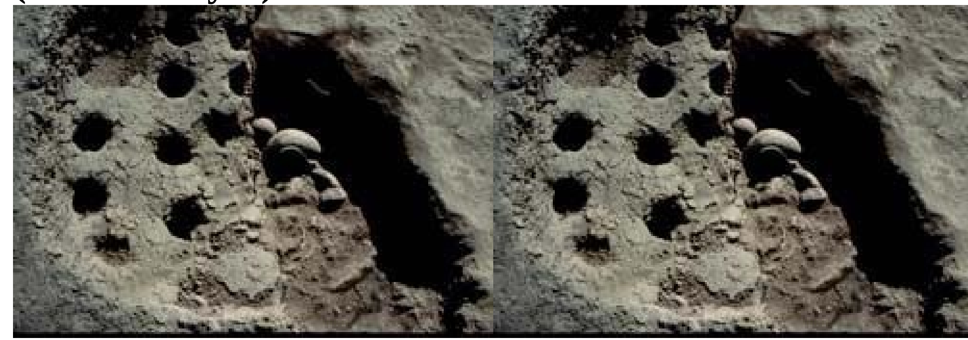
“The ground is leveled and then covered to a depth of about six inches with buffalo's or cow's dung made up into pats and dried. On this fuel the jars are placed in every possible position, except with the mouth upwards or downwards. To econo mize space, the bases of some of the jars are quite frequently placed inside or against the mouths of others. When the larger pottery has been so dis

Ceramic Technologies! !

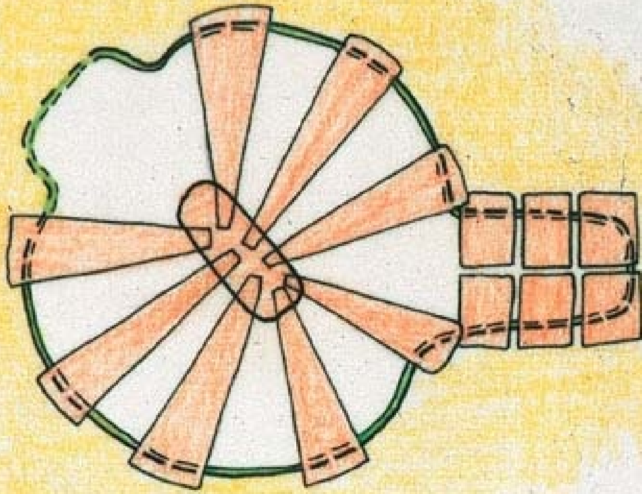


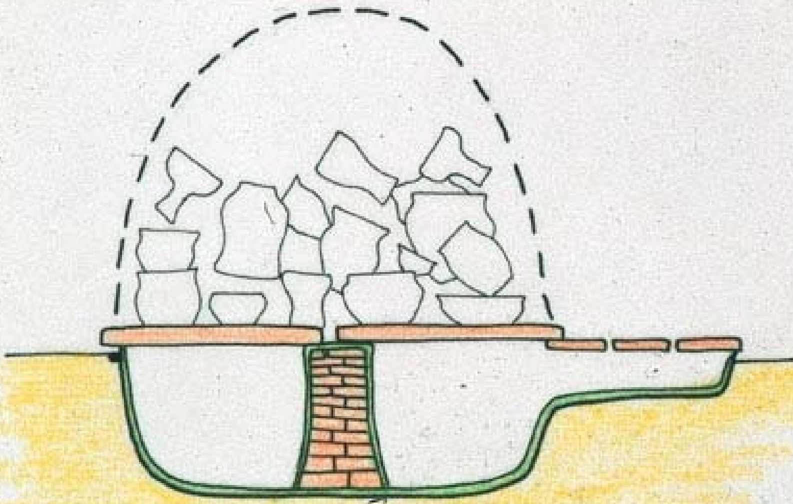
A pottery production area at Harappa. There is evi
A pottery production area at Harappa. There is evi-
dence for 500 years continuity of ceramic production
dence for 500 years continuity of ceramic production in
in this area. A small kiln in the upper right corner
this area. A small kiln in the upper right corner dates
dates before 2800 BC while the other two kilns in the
before 2800 BC while the other two kilns in the forefront

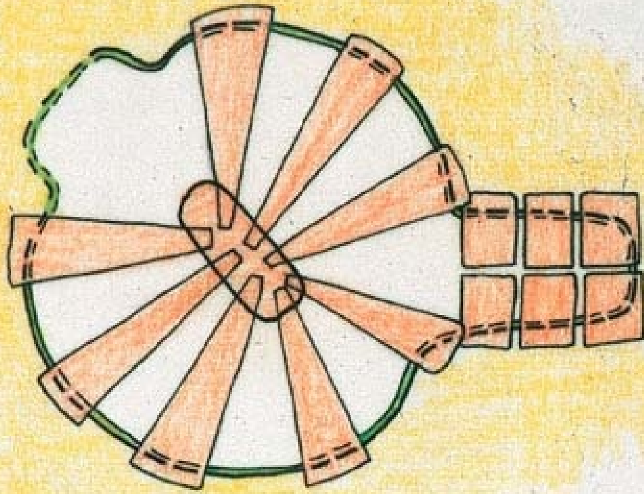
forefront date to about 2500-2300 BC
date to about 2500-2300 BC (*Kenoyer*)
(after Kenoyer)

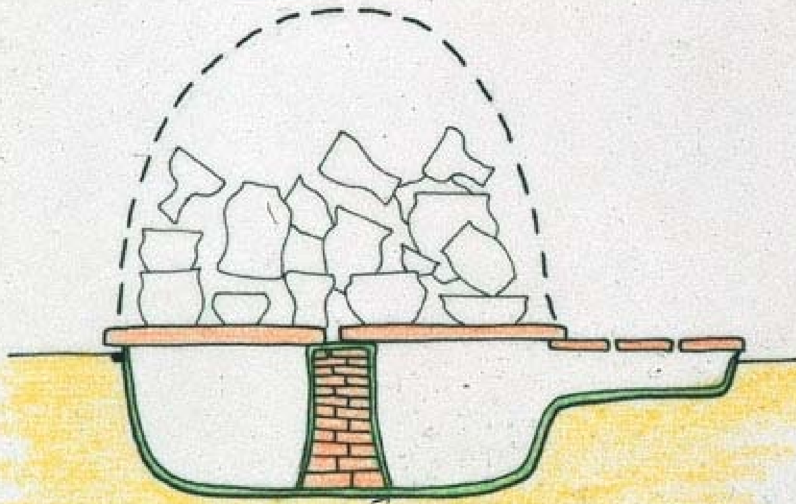


Fuel-pots partition with holes. The kilns of this de
Fuel-pots partition with holes. The kilns of this de
Fuel-pots partition with holes. The kilns of this design are
signs are widely used all over the modern Pakistan
widely used all over the modern Pakistan and Afghani
and Afghanistan
stan

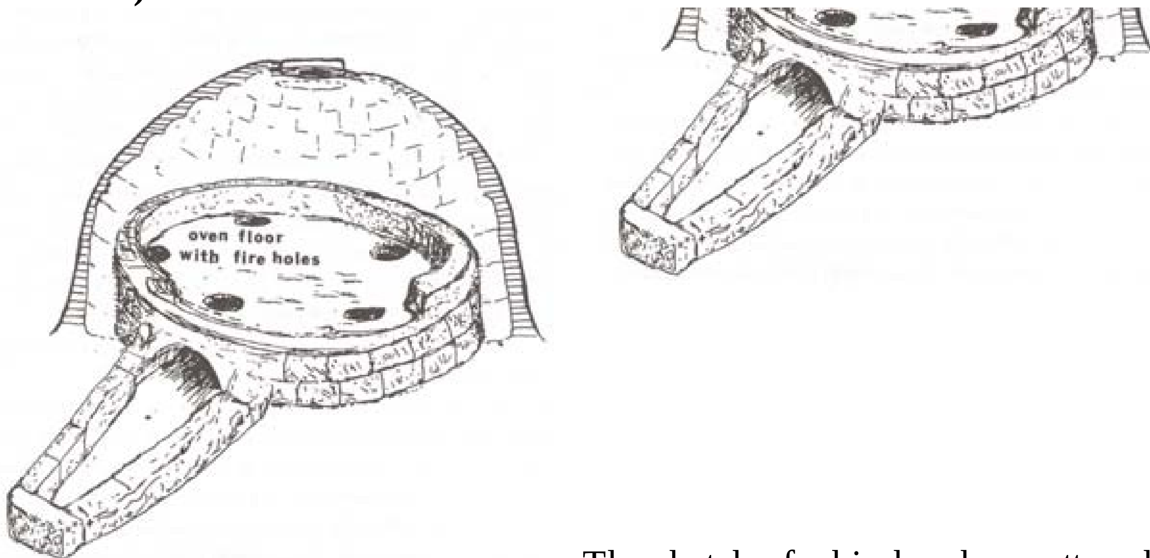








Indus updraft funnel-shaped kiln (after Fairservis)



The sketch of a bi-chamber pottery kiln

The sketch of a bi-chamber pottery kiln
from Harappan period (after Possehl)

archaeological remains at Mohenjodaro, Harappa, Chanhu-daro, and Balakot and other sites, the use of kilns was the norm.The most sophisticated and best-documented kiln in the Indus Civilization is the funnel-shaped, up-right type. Kilns of this type are splendid little pieces of Harappan technology. Mughal has documented their use in Cholistan

even at the modern time.
even at the modern time.

workshops remained in the same locality for hundreds of years. It is interesting to note that just like the potter's wheel has not changed much during the last four thousand years, so did not the design of the kiln. These pottery kilns, scattered around all over Pakistan in small and large villages, resemble so much with the Harappan kilns, as described by Mughal and others, that they seem to have been built from their

Ancient Pakistan - An Archaeological History!
posed, it is covered with the flatter vessels and Forms and Shapes
The Indus potters created elegant
dishes, and, finally, another layer of dung, mixed
pedestal dishes or bowls,

with a little brushwood mixed with reeds, is spread
commonly referred to dish-on
over all and covered with a thin layer of dust. The
stand and bowl-on-strand

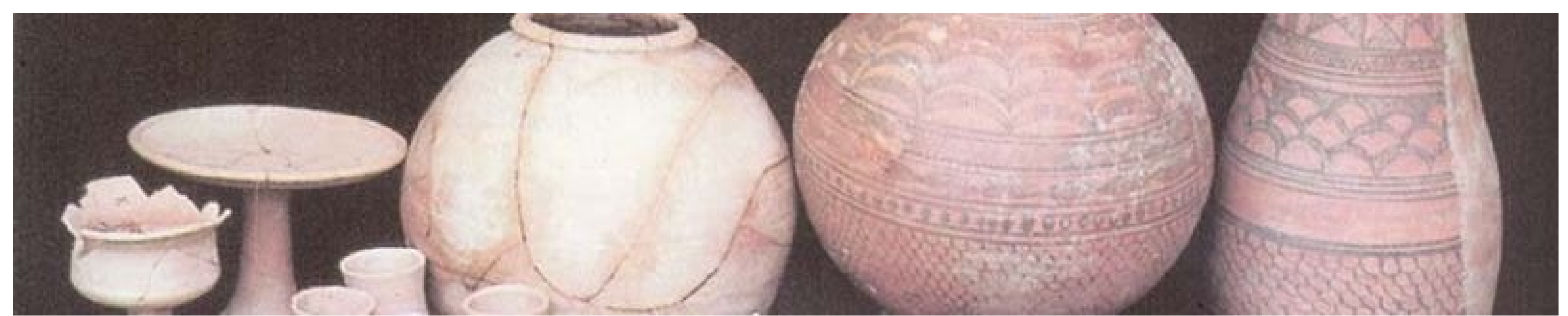


heap, which is generally either square or rectangu



vessels. Some are decorated with
lar, is then fired in three or four places, usually at
incised circles and covered with

red slip and simple black bands,



others with elaborate floral and



geometric designs. These vessels, which come in many different styles and decorative patterns, were probably used for serving food presenting Another -

Deep bowl with wide mouth and flaring rim, along with some other familiar forms, Harappa (after Kenoyer)

to guests or for ritual offerings. perhaps socially

Different forms and shapes of the Harappan pottery from Harappa (after Kenoyer)

Although ceramic decorative styles changed significantly through the Harappan period, many basic shapes stayed the same throughout, with each household having a similar array of pottery vessels. The large storage jars without painted designs, akin to the

significant because it is profusely *mutka* of today's Pakistan, probably held water or grain, whereas the elaborately painted

painted – pot form
is the S

vessels may have been wedding gifts or used for ritual purposes. Many small drinking vessels with flat bases may have been used in the home for drinking water, milk, profile vase, often very large in buttermilk and alcoholic beverages. Shallow bowls probably contained cooked food or



bread; the larger plates may have been used for eating.

size. These are of exquisiteOver time there was a gradual change in the shape of drinking vessels used in the cities. designs and quite beautiful toEarlier flat-bottomed forms became more globular and were scored with multiple
look at.

grooves. In the latest phase of the Indus cities (2000-1900 BC) the distinctive pointedbase goblets were made by the thousands, using the fast wheel for rapid mass production. Simple groves were incised on the exterior, possibly to keep them from

Another distinctive vesselslipping out of the hand.



associated with the Indus cities is

Undecorated shallow plates the perforated cylindrical jar but

sites The use of such terra- cotta plates was commonthe use of this vessel is still a Ceramic Technologies!

found at several Harappan mystery.among the Hindus of Pakistan before the Partition for

serv- ing food on weddings or other public occasions. In
Some surmise that it

The Indus potters created elegant
parts of India, they are still used as disposable utensils.pedestal dishes or bowls,
that it was for burning incense.

cotta plates was common commonly referred to dish-on

stand

and
Another explanation is that it is a
bowl-on-strand

A few typical shapes of Harappan pottery. Note the dish-on-strand with incised concentric lines at the center of the plate and its partial slipping. Also, note the flat plate, goblets of two main shapes and a water storage vessel, all of them undecorated.

charcoal-burning container, used

among the Hindus of Pakistan

vessels. Some are decorated with
for hand-warming in winter

before the Partition for servincised circles and covered with

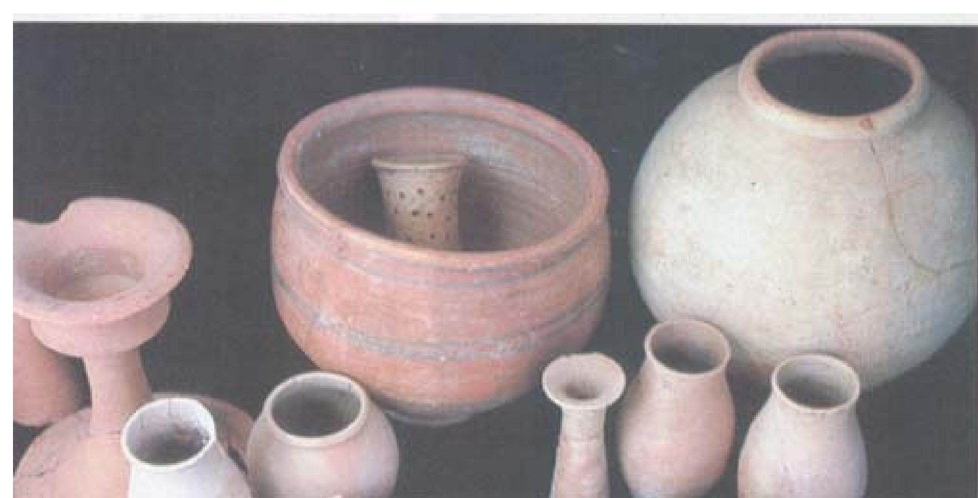
mornings. Such perforated

ing food on weddings or other

red slip and simple black bands,

devices of varied designs are
others with elaborate floral and
quite geometric common in modern

public occasions. In parts of Baluchistan and are often used as designs. These



India, they are still used as vessels, which come in many



a cost-effective hand-warming Deep bowl with wide mouth and flaring rim, along with different styles and decorative
device.

Different forms and shapes of the Harappan pottery from some other familiar forms, Harappa (after Kenoyer)**Harappa (*Kenoyer*)**

in

a

disposable utensils. patterns, were probably used for

Alternatively, tothe vesselguests or for have been wrapped in cloth andofferings. Another as -a perhapsstrainer for socially significant because it is profusely beverages. With the cloth on the profile vase, often very large in size. These are of exquisite designs and quite beautiful to look at.

Another distinctive vessel associated with the Indus cities is the perforated cylindrical jar but the use of this vessel is still a mystery. Some surmise that it



was to catch fish, others think

that it was for burning incense. **A perforated jar from Harappa: a perfect example of Harappan hand-made pottery**Another explanation is that it is a

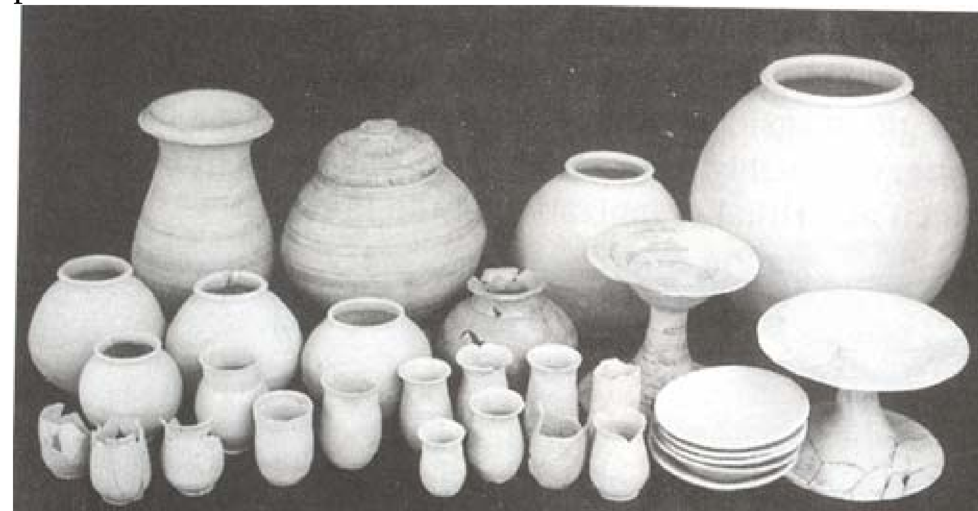
charcoal-burning container, used for hand-warming mornings. Such the corners. The burning takes about three days, the potter and his assistants sitting up the first night

contained thirty-three vessels, most of which are
to cover flame holes with sherds, so as to retard the

unpainted. This group represents several shapes
combustion as much as possible. Then for seven
and forms of pottery, some of them in multiples days the pile is left to cool. A more primitive kiln (after Kenoyer)
could not be imagined, but it can produce well

baked articles capable of standing a considerable Page 348
amount of kn.ocking about. As the same piece of ground is used repeatedly for firing pottery, often the highest part of the village is an artificial mound almost entirely composed of ash and potsherds" (11).

The same kind of 'primitive kilns' have been found in other parts of Pakistan. One such example
A few typical shapes of Harappan pottery. Note the
has been described by Mughal from Cholistan (12).
dish-on-strand with incised concentric lines at the
It is assumed that a similar kind of arrangement for
the flat plate, goblets of two main shapes and a water
baking of pottery was probably employed by the
storage vessel, all of them undecorated.
Early Harappans and the peoples before them. The use of these kilns continued even into the Harappan
devices of varied designs are quite common in modern
Baluchistan and are often used as
in winter
perforated[363]



well as the Indus Valley and the continental
India, but the use of the fast spinning wheel in

throwing and shaping of pots was specific to the

Harappan Civilization. In this respect, the story
times and several examples of them have been discovered. One such kiln, at Harappa, “contained
of the Harapan pottery essentially boils down to
cakes, lumps, and stones that would absorb heat
the use of the fast spinning wheel in the service early in the firing sequence, then radiate heat as the

a greater degree than with any of the other types since the separation of the fuel chamber from the setting area makes it possible to regulate heat and air intake. In a double-chambered kiln, which Wright

of
mass scale production of identical pots.
fuel was consumed" (13). It was most likely used for A thin-walled, un-decorated, pot for drink(15) excavated near Mehrgarh at Lal Shah, a regufiring small vessels or figurines (14).India, on the other hand, exclusively employed a
slow rotating simple wheel, even in historic
ing water; a fine example of mass
lating hole connected the chamber with the exterior
produced ware on high speed wheel

of the kiln, making it possible for the potter to view conditions in the interior of the chamber to control the circulation of heat.

times, and the use of such an instrument
Pottery kilns have been found scattered has been common into recent times. Inat Mohenjo-daro, Harappa, Chanhu-daro, Nausharo, Kot Diji, Balakot
one common version, either a large flat and Lal Shah. In many instances the kilns had been

Ceramic Technologies

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stone or a wooden disc is mounted upon made in old, abandoned buildings. Although some

a pivot and spun by hand until sufficient pottery making took place in widely dispersed localimomentum is attained. Several vesselsties, a series of pottery kilns on the northwestern corner of Mound E at Harappa demonstrates that

can be shaped before the wheel slows pottery was fired in a segregated area of the city.

down. Another version employs anBeginning in the late Kot Diji phase of the Early It is interesting to note the archaeological evidence coming from Iran and Mesopotamia exceedingly heavy spoked wheelHarappan times, these potters workshops remained where foot-driven potter’s wheel is attested right before the flowering of the Harappan

resembling a cart-wheel in shape; it isin the same locality for hundreds of years. It is interesting to note that just like the potter's wheel has

Civilization in Pakistan.Similarly, it is noteworthy that some pots originating in



Baluchistan and lower Sind in the Early Indus period were clearly wheel thrown at relatively high speed. Foot-wheel is still in use in Sind, Punjab, and the NWFP and it

A dish-on-stand piece: a typical example of wheel
spun by a loose stick inserted in a slot
near the rim.
not changed much during the last four thousand
years, so did not the design of the kiln. These pottery kilns, scattered around all over Pakistan in This type of wheel is exceedingly small and large villages, resemble so much with the primitive and has many disadvantages,Harappan kilns, as described by Mughal and others, the chief being that in the process of that they seem to have been built from their Ar

closely resembles that which is found right across the border in Iran up to the Near East. chieological sketches.
Thus, it is very well possible that the spinning wheel did originate in the regional cultures of the Early Indus era in lower Sind and Baluchistan from where the technology diffused westward to Iran and the Near East on one hand and into Punjab on the other. The diffusion into the present
physical barrier of the Thar desert between the two geographical regions, with the

result that the foot-wheel was not known in the present-day India until very recent times. Here the hand-spun

Page 340

The best-documented kiln in the Harappan Civilization is the funnel-shaped, up-right type. Kilns of this type have been discovered throughout the Indus civilization; they are splendid little pieces of Harappan technology. Mughal has documented their use in Cholistan even at the modern time (12). The body of these kilns is a two story affair: a lower chamber, where the fuel and fire are located, and an upper area, where the material to be baked or heated was placed. These are separated from one another by a floor with holes in it that allow for the circulation of heat and gas. Some provision for supporting the floor from below is made, which may be a pillar or a small wall of bricks, as in some of the Harappan examples. This is all covered during firing with a dome that is usually taken apart at the end of firing to access the contents of the upper chamber, and it is therefore a temporary part of the facility. In front of the domed double chamber is a constricted neck, which gives the whole affair the look of a funnel when viewed on plan. This leads to lower chamber, which is there for several purposes. It allows the kiln to be fueled and the fire stocked. It

The introduction of the potters' wheel, especially that of high speed variety, initiated a fundamental

also controls the amount of air that goes to the fire and plays a role in determining the temperature and

change in the Harappan economy and probably

the oxidation/ reduction reaction.
Double-chambered kilns were built with cen

'industrialization' of the Indus cities. In pre-wheel times women made pots, primarily

ber, thereby separating it from the fuel chamber.

for their own domestic consumption. Pot-making techniques were laborious and time

control temperatures and atmospheric conditions to

consuming, so that absolute production was strictly limited. The wheel greatly shortened
to make a vessel, reduced[364] simuItaneousIy improved the quality of the ware. Full-time male specialists essentially
eliminated women from pottery work, thus giving birth to a commercial industry

which



Some burial pottery from Harappa, wheel-made and undecorated

Forms and Shapes: Although ceramic deco

rativeplayed anchangedimportantsignificantlyrolethroughin the

Harappan period, many basic shapes stayed the same throughout, with each household having a similar array of pottery vessels. The large storage jars without painted designs, akin to the *mutka* of today's Pakistan, probably held water or grain,

the physical effort involved,and throwing a large jar, the wheel necessarily slows down and if the pot be very large a second and third spin may be necessary. Furthermore, unless the wheel is spinning very

whereas the elaborately painted vessels may have

fast, it has an eccentric or wobbling motion which makes it somewhat difficult to mould

been wrapped in cloth and used as a strainer for the
been wedding gifts or used for ritual purposes. preparation of fermented beverages. With the cloth Many small drinking vessels with flat bases may

the vessel perfectly true. It is interesting, therefore, to find that throughout the whole of

on the outside, the numerous perforations would have been used in the home for drinking water,

Sind and also in Punjab this type of wheel is not used, but the more efficient foot-wheel

allow the liquor to strain through and collect in the

is employed. milk, buttermilk and alcoholic beverages. Shallow

bowls probably contained cooked food or bread; the
larger plates may have been used for eating.
central hollow area and be removed with a dipper or by long straws. These vessels have been found with burial offerings in the Harappan cemetery, Over time there was a gradual change in the

Most of the Early Indus pottery is hand-made although there are some instances where

where they are placed vertically inside large open

shape of drinking vessels used in the cities. Earlier the use of a potter's wheel is clearly indicated. On the other hand, most of the Harappanmouthed vessels. Studies of the sediments inside

flat-bottomed forms became more globular and these perforated vessels have not revealed the nawere scored with multiple grooves. In the latest

pottery was formed on potter's wheel that was turned at both low and high speeds. The

ture of the beverage being brewed, but ongoing

phase of the Indus cities (2000-1900 BC) the disinstances of hand-made pottery are also abundant. Pots are also known where a hybrid research of the porous pottery itself may recover

tinctive pointed-base goblets were made by the
some traces of organic materials to help identify the

technology has been used, that is, it has been made in parts, some parts on wheel andthousands, using the fast wheel for rapid mass provessel's contents.some by molding by hand, and then joining them together.

duction. Simple groves were incised on the exterior, The most common form of decoration for pots
possibly to keep them from slipping out of the hand. of the Early Harappan times, from which the Harap



Pointed base goblets which are found abundantly in the large Harappan cities, especially at Harappa and Mohenjodaro.

Pointed base goblets which are found abundantly in the large Harappan cities, especially at **The pointed base results from rapid manufacture off a fast wheel and makes it easy for stacking in the kiln. The grooves**
Harappa and Mohenjodaro. The pointed base results from rapid manufacture off a fast wheel **around the body may serve as a simple decoration, but they may also allow for a better grip. These cups appear to have**
and makes it easy for stacking in the kiln. The grooves around the body may serve as a simple decoration, but they may also allow for a better grip. These cups appear to have been used for **). The presence of these goblets are especially common from the Late Harappan period.**
drinking water in public places, as has been a tradition with the Hindu population of India. Some of these goblets have a seal impression which probably means that they were made for The Indus potters created elegant pedestal some specific owner or place (after Kenoyer) pan pottery takes it cue, was painting with black on dishes or bowls, commonly referred to dish-onred or buff. Other colors that occur are orange,
stand and bowl-on-strand vessels. Some are decowhite, dirty blue, and yellow. The paints were aprated with incised circles and covered with red slip

The potter's wheel had been in use for well over one thousand years before the rise of

plied by brush or some brush-like implement. The
and simple black bands, others with elaborate floral paints were genreally minerals, iron and manga and geometric designs. These vessels, which come

the Indus cities, but its full potential for rapid mass production was not realized until the

nese oxides being very common, although lamp in many different styles and decorative patterns,

full bloom of the urban period. Indus potters used the fast spinning wheel to produce

black was also used. The categories of black-on

were probably used for serving food to guests or for small vessels that were thrown off a large lump of clay in rapid successions. After the red, and gray-on-red sum up the general types of

presenting ritual offerings. Another - perhaps so
decoration on the Harappan pottery. Painted pottery

shape was formed and smoothed, a string was used to cut the base, and the vessel was

cially significant because it is profusely painted – is probably not more than 10-15 percent of the

total,

pot form is the S-profile vase, often very large inremoved while the wheel was still turning. The process was repeated again and again varying from site to site. Both fine and coarse fab

size. These are of exquisite designs and
beautiful to look at.
quite
rics are present. Slip is present and absent almost

until the lump of clay had been used up, thereby conserving time and effort required in

in equal proportion.
Another distinctive vessel associated with the

repeatedly centering a lump of clay for each vessel. These rapidly produced vessels

Finishing of Pottery: It was common prac

Indus cities is the perforated cylindrical jar but thegenerally were left undecorated and untrimmed and may have been used as disposable tice during the Early Indus period to slip most if not

use of this vessel is still a mystery. Some surmise all of the outside of pots with a thin layer of suitable that it was to catch fish, others think that it was for

containers. Other vessels were made first on the wheel and then trimmed by hand and

clay that helped maintain surface color and texture

burning incense. Another explanation is that it is aburnished to produce more elegant forms and more refined surfaces. Many vessels wereas well as assisted in controlling the porosity of the

charcoal-burning container, used for hand-warming
vessel. Much of the slipped pottery of this time is

trimmed on a slow-turning wheel, leaving the chatter-marks of the trimming tool visible

in winter mornings. Such perforated devices of varied designs are quite common in modern Baluchis red, but buff slips are also fairly common. There are

also colors in between these extremes that seem to tan and are often used as a cost-effective handPage 341result from the imperfect control the ancient potter warming device. Alternatively, the vessel may have

365 Harappan Civilization - The Material Culture had over kiln temperature, oxygen, and the selection of raw material.

There are no fully developed glazes in the Early Harappan period. Like the Early Harappan potters, Harappan also did not develop the art of glazing. This is despite the fact that the Harappans painting often has a utilitarian quality and a kind of heavy insensibility. On the other hand, some pieces show a remarkable delicacy of line and artistic feeling. This quality may indicate the existence of regional variations.

Ceramic Technologies!
seem to have the basic knowledge of related chem
painted designs
This process, known as "turning" or "trimming" is istry and the technique for the development of high
included floral and
a basic requirement for most thrown ware, and it temperatures in the kiln. Only one ceramic, gener geometric motifs

would appear to require a wheel that oscillates ally called Reserved Slipped Ware, has a kind oflittle, if at all. arranged in panels crypto-glaze. beginning at the rim

Pottery Decoration: Despite the fact that the and A fundamentail characteristic of the true high to Harappans had had some superb examples of the lower speed potter's wheel is that it is a flywheel that of

painted pottery before them from the earlier cul
provides momentum and a continuous rotation so
the vessel. At first
tures, Harappan pottery comes out as though they
that centrifugal force can be utilized to "throw" a
glance this style
had seen nothing worth imitating or copying: the
might
look pot from soft plastic clay. According to George
rather
Foster (*The Potter's Wheel: An Analysis of Idea* nearest they came to slapdash. The lines the
past
to
and Artifact in Invention; Southwestern Journal of
adopt tend to be thick and


A water storage pot with inter

Thestyleof
extending
body
the ‘scale’ and ‘in
Anthropology, Vol. 15, No. 2. Summer, 1959), the
variable in width

tersecting
circles’
essence of the invention of the fast spinning potter's and density, often **A padestaled globular pot from**
designs. Natural
wheel, and its cultural consequences, is not the
Harappa, a perfect example of wheel
past the
Harappa, a perfect example of continuing thrown and wheel-decorated Harappan
m o t i f s
s u c h
a s
elaboration of a slowly rotating platform that was **wheel- thrown and wheel**
point at which they vessel
birds, fish, animals,
hither to fore known, but the possibilities of have **decorated Harappan vessel**
should
plants,
trees,
and
exploiting the centrifugaI force generated by the
stopped. The paint
pipal
leaves, how
ing
is
action of a fast and continuous motion. not carefully

ever, are not infreThis important aspect of technology has not beencontrolled and there is an effort to cover the entire quent. Abstractuniversally recognized by anthropologists and theydesign area with work. But on closer examination, geometric motifs, ahave generally treated the slow-rotating turntable one can find order here, a plan for the layout and hall mark of theexecution of each painted vessel. If the Early and the fast spinning wheel on the

same basis. Amri-Nal pottery of However, a few scholars of yesterday did highlight Harappan period, especially the Amri-Nal culture, earlier times, are the role of centrifugal force in shaping of pottery. had not produced some superb examples of painted comparatively rare. For example, Gordon Childe stated: "In pottery pottery, the Harappan pottery might have looked As with the uniform manufacture the function of the wheel is to supply quite appealing. What makes it crude is the comrepertoire of forms centrifugal force to a lump of still pIastic clay parison with the pottery produced and decorated in of the Harappan earlier times in Baluchistan and lower Sindh.

secting circles painted decora

Ceramic Technologies

potters, so the

accurately thrown on its center. Such a well centred

lump when spinning fast, needs only light guiding Polychrome pottery, so common in southern pressure from the potter's hand to rise and assume Baluchistan in the preceding centuries, is rare any sectionally circular form he wants to impose on in the Harappan period. What is available at it. Instead of expending his own muscular energy in Harappa and Mohenjo-daro shows that most



pressing, molding, or coiling the clay, he merely polychrome paints were applied after firing,

directs energy imparted to it." Scot, likewise,

A thin-walled, wheel-thrown, small using organic or fugitive mineral pigments;

cylindrical jar with flaring rim and

makes clear the principle of a rotating disc as
the poor preservation may explain the rarity
woman burial at Harappa applied to pottery, that is, the shaping of pots by of polychrome decorative pottery.
No example of Harappan polychrome pottery has yet throwing: "by spinning on a rapidly rotating wheel, the hands guiding the shaping
been found that could even remotely com
instead of directly effecting it." And again: “The potter's wheel introduced the entirely
pare the superb colorations of south Balu
novel principle of 'throwing' pottery, i.e. of shaping the plastic clay by spinning, the



Harappan painted pottery, black-on-red, grave goods from Harappa. These pots

Harappan painted pottery, black-on-red, grave goods from Harappa.

are presumed to belong to the early parts of the Harappan period. The burial pot **These pots are presumed to belong to the early parts of the Harap pan period.**



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chistan in the Amri-Nal phase.
Recent studies of painted pottery from Harappa

and the smaller regional site of Nausharo in Sindh show that painted designs and styles of pottery changed significantly through the Harappan phase. These changes were not uniform throughout the Indus Valley but reflected regional patterns of cultural development that took place at different times during the 700 years of the Harappan Civilization. The most striking illustratetions are on the burial pottery from Harappan cemetery R37, where hundreds of burial vessels have been recovered. The pottery from the earliest burials, which may date from 2,600 to 2,100 BC, have painted designs comprised of plant and geometric motifs. These designs are similar to
the elaborately painted pottery found in the habita

tion areas of the mound. In the middle levels of the cemetery, one finds the same general shapes, but they were much larger and painted with only geo metric designs or simple horizontal bands. In the latest levels, which probably date to around 2,000 BC, the burial pottery was primarily unpainted and unslipped, a trend also seen in the dominance of unpainted pottery in the living areas of the city. We also see a striking example of this change in some highly decorated burial pottery that was intentionally covered with a plain red slip to obscure the painted design.

The trend towards unpainted burial vessels appears to be short-term pattern that was eventu ally abandoned. Because painted pottery takes longer to produce and the painted designs have specific social and ritual symbolism, the transition

from highly deco



rated to less deco
r a t e d p o t t e r y

probably reflects Ceramic Technologies! **Restored water-storage vessels from Mohenjo-daro** important changes
Nausharo in Sind show that painted designs and styles of pottery changed significantly in economic, socialthrough the Harappan phase. These changes were not uniform throughout the Indus

and ritual life. Valley but reflected regional patterns of cultural development that took place at

ExtraLarge different times during the 700 years of the Harappan Civilization. The most striking illustrations are on the burial pottery from Harappan cemetery R37, where hundreds of

Vessels: Some of burial vessels have been recovered. The pottery from the earliest burials, which may the Harappan pots

date from 2,600 to 2,100 BC, have painted designs comprised of plant and geometric are quite large; amotifs. These designs are similar to the elaborately painted pottery found in the meter or so tall and habitation areas of the mound. In the middle levels of the cemetery, one finds the same general shapes, but they were much larger and painted with only geometric designs or about that in diame simple horizontal bands. In the latest levels, which probably date to around 2,000 BC, ter. As the speculathe burial pottery was primarily unpainted and unslipped, a trend also seen in the

tion goes, theredominance of unpainted pottery in the living areas of the city. We also see a striking example of this change in some highly decorated burial pottery that was intentionally

must be the vessels
covered with a plain red slip to obscure the painted design.
larger than these.

The trend towards unpainted burial vessels appears to be short-term pattern that was In experimental eventually abandoned. Because painted pottery takes longer to produce and the painted studies, Kenoyer designs have specific social and ritual symbolism, the transition from highly decorated **Black slipped storage jar from** a n d a s s o c i a t e s to less decorated pottery probably reflects important changes in economic, social and **Harappa weith inscription near** ritual life. showed that me **the rim (HARP)** Extra Large Vessels



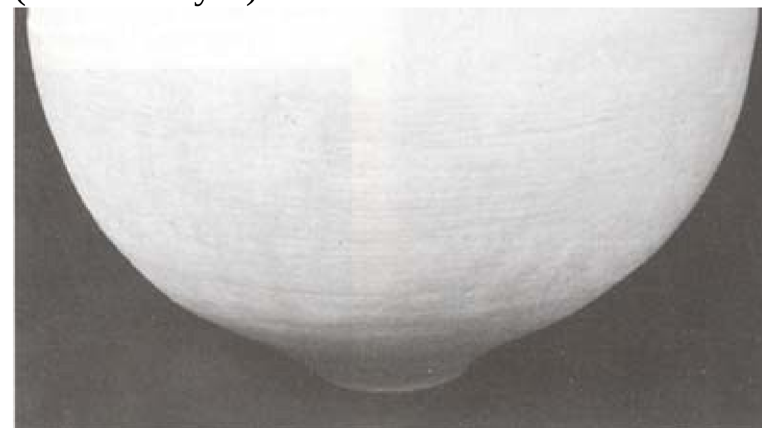
dium and largesized jars were produced with significantly different manufacturing stages, requiring different allocations of production t i m e a n d w o r k space and probably only the most s k i l l e d p

o t t e r s were able to build the very large storage jars. Mackay noted Th.at the large pots were made in sections with what he called



Some of the Mature Indus pots are quite large; a meter or so tall and about that in diameter. As the speculation goes, there must be the vessels larger than these. In recent experimental studies, Kenoyer and associates showed that medium and largeTwo large storage vessels at Harappasized jars were produced with significantly

(after Kenoyer)



A large globular pot with no slip,

from a burial at Harappa. This is a typical

recovered from a burial at

example of multi-stage wheel-throwing

Harappa. This is a typical example

used to hold water as it does in rural areas

of multi-stage wheel-throwing

of modern Pakistan

technique. This type of jar may

different manufacturing stages, requiring different allocations of production time and work space and probably only the most skilled potters were able to build the very

large storage jars.

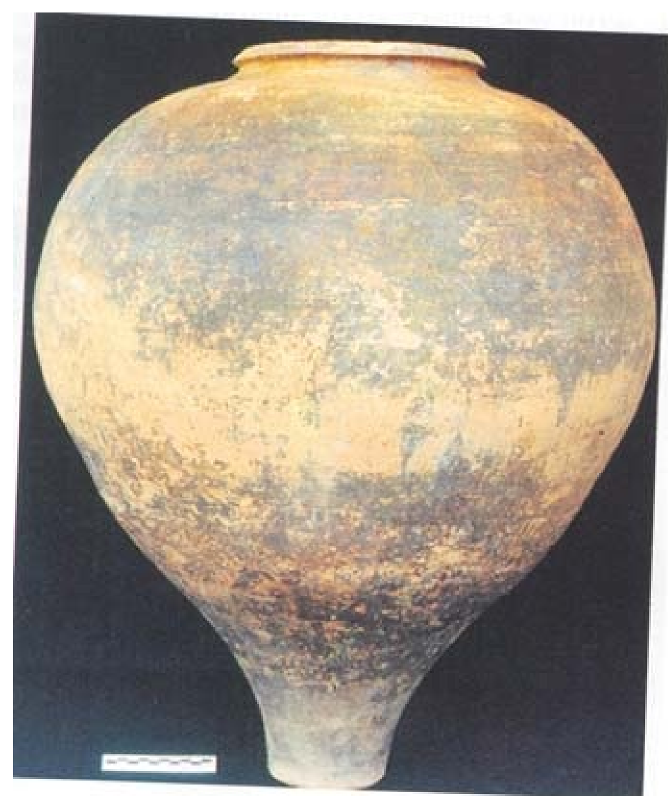
Mackay noted that the
Another large size vessel from Harappa. It ewas

large pots were made in sections with what assembly. The assembled vessel was cleaned up and the external signs of the **probably used as a sump for household refuse** he called ‘coiled strips of clay’. Wright tells tripartite
us that they were made in three separatemanufacturing process removed as best as could

be done. The parts; the base, the body, and the rim. The was then slipped and base was made on a chuck. The midsection pot
of the pot was fashioned separately, ‘coiled strips of clay’. Wright (22) tells us that they

possibly also using a chuck. The potter then were made in three separate parts; the base, the melded the two parts together. The rimbody, and the rim. The base was made on a chuck. portion of the pot was then made and The midsection of the pot was fashioned separately, wedded to the base and midsection

have been used to hold water as it Page 354
does in rural areas of modern
Pakistan.



possibly also using a chuck. The potter then melded the two parts together. The rim portion of the pot was then made and welded to the base and mid

section
assembly.
The
away during firing. The large storage vessels are

assembled vessel was

often pointed at the bottom presumably because they were set into the house floors. They were

Large, black-slipped jar with narrow
base. The rim is made with a slight
ridge for holding a lid. Both interior and

exterior are covered with a black slip,
most likely used for storing drinking water, just as *muttkas* are currently used in the villages of of modern Pakistan.

storage of seed, garin, and flower. The base is first built and then the vessel is raised on it stage by stage through spirally applying a strip of clay. Such vessels are built in several stages and

cleaned up and the external signs of the trappertite manufacturing process removed as best as could be done. The pot was then slipped and sometimes decorated. Since the midsection of these large pots was heavy and not strong, the Harappan potters

previously applied clay dry. Slowly, days

habitually tied string around the midsection to sup

by
letting
port the clay after it had been shaped. The pressurethe

of the soft clay against the string left an imprint on the outer surface, which remained with the pot

takes

when the string burned away during firing. These

shape. The

pots were sometimes coated both on their interiors

and exteriors with a thick application of fine clay dishes, bowls, and cooking pots. The dishes are generally flat, the bowls are of varied shape and sizes, and the cooking pots surprisingly resemble those still used in the rural areas of Pakistan. Interestingly, modern aluminum cooking pots are also of the same general design and shape as those used in the Harappan Civilization.

ThedistinctiveHarappancookingpots evolved from Amri and Kot Diji styles of the Early Harappan

period and gradually spread to all of the Indus settlements. Cooking pots were made in sizes that range from miniatures used as toys to ex

storage vessel is then finished by applying a slip, generally white clay. The wall thickness of the middle section is considerably larger than the

mixed with iron oxide pigment to produce the black

A large storage vessel *in situ*
at Harappa

tremely large vessels that may have been used for exterior and red interior color of the pots based on the manipulation of atmospheric conditions in the kiln.The large storage vessels are often pointed at the bottom presumably because they were set into the house floors. They were most likely used for cooking community feasts. Although there are some

(after Konoyer)

regional variations, most have either a red- or black

slipped rim, with one or two ridges. The highly functional form has a round bottom to provide even distribution of heat and a low center of gravity to keep

bottom and the rim and rags are often wrapped around this section for the purpose of it from tipping over filled with boiling liquid. On the reinforcement. Surprisingly, these large

used in the villages of modern Pakistan. Ethno

graphic observations have shown that these large storage bins are not produced by the vessels could have most probably used for storing *in-situ* grain as it is done in the villages of Indian Punjab a small group of women, of whom one acts as the 'project even today.

Although there is no direct archaeological evidence, very large vessels were probably also built *in situ* through handcrafting. These were, of course, unbaked vessels made of clay. Such extra large vessels are still built in Indian Punjab and Ha ryana. These are used for the storage of seed,

There are countless examples of terracotta kitchen utensils from the Harappan

phase,

vessel is raised on it stage by stage through spirally

mostly recovered from Mohenjodaro and Harappa but also from other sites. They

applying a strip of clay. Such vessels are built in



include dishes, bowls, and cooking pots. The dishes are generally flat, the bowls are of
previously applied clay dry. Slowly, the required Ledge shouldered cooking pots with low neck and flaring varied shape and sizes, and the cooking pots surprisingly resemble those still used in the rim. One vessel has red slip on the neck and rim, while

ished by applying a slip, generally white clay. The **the other is fired grey-black. A small black fired bowl is**

rural areas of Pakistan. Interestingly, modern aluminum cooking pots are also of the seen in the foreground. Period III, Harappan, 2300-2200

heavier than the bottom and the rim and rags are **B. C.**
often wrapped around this section for the purpose
of reinforcement. Surprisingly, these large *in-situ*

storage bins are not produced by the village potter,The distinctive Harappan cooking pots evolved from

instead, a small Ceramic Technologies!

Amri and Kot Diji styles of the Early Indus period

of whom one acts

and gradually spread to all of the Indus settlements.

mangaer ’, does

Cooking pots were made in sizes that ranges from

Kitchen

miniatures used as toys to extremely large vessels There

are countless ex

that may have been used for cooking community of terrafeasts. Although there are some regional variations,

sils from the

most have either a red- or black-slipped rim, with one

mostly recovered

or two ridges. The highly functional form has a round

on the vessel surface.

It must be noted that the availability of potter’s wheel does not necessarily make the hand-made pottery a redundant technology. A large proportion of the Harappan pottery is in fact handmade and this technique is still in use in many parts of modern Pakistan, especially in upper Sind and lower Punjab. There are two reasons for the

amples


Flat dish with short bilateral project

Flat dish with short bilateral pro

survival of the hand-made pottery. First, it is a ‘low tech’ method of manufacturing; the artisan need not be highly trained as it is necessary for the use of wheel. Second, hand-made pottery allows the realization of diverse shapes and unusual ways



of decoration. One of the examples from the

and Harappa but

bottom to provide even distribution of heat and a low

s i t e s , s u c h a s

ing rim. This simple dish was found

ject- ing rim. This simple dish was Harappan times is the formation of perforated jars.

with other burial pottery in the grave

found with other burial pottery in Examples from modern-day Pakistan are the cemetery. The dish, made on wheel,

the grave of an adult male in the highly had no slip on it. (after Kenoyer)
decorative A striated terracotta hanging bastradition in the

A striated terracotta hanging basket for keeping food

center of gravity to keep it from tipping over filled

Chanhu-daro.

with boiling liquid. On the lower body, the vessel
Harappan cemetery. The dish, Bhawalpur area. ket for keeping food cool and out
made on wheel, had no slip on it.
Similarly, in spite of the tremendous advantages of the of reach of cats and dogs.
was usually plastered with a thick slurry of clay

fast spinning wheel, the use of the slow rotating disc
continued. This is evident from[368] available
archaeological evidence which shows that while the use

mixed with ground pottery or grog. This thermal insulation protected the vessel from

Harappan times, the use of slow turning wheel is

direct flame so it would not crack during repeated heating. Another important feature of

the



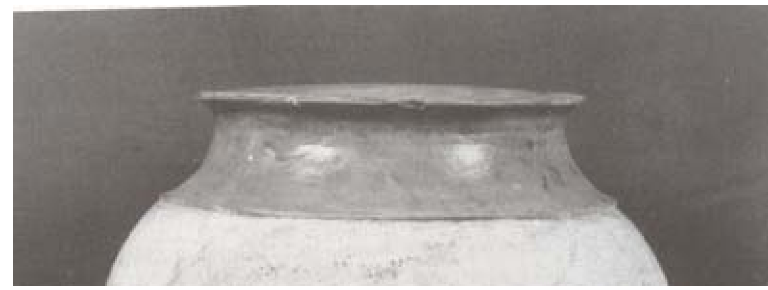
lower body, the vessel was usually plastered with a thick slurry of clay mixed with ground pottery or grog. This thermal insulation protected the vessel from direct flame so it would not crack during repeated heating. Another important feature of the Indus cooking pot is the strong, outward projecting rim, which makes it easy to lift the hot cooking pot with two sticks or even with the bare hands. This optimum form of cooking pot remained in use throughout Pakistan long after the decline of the Indus Civilization and is still found in most traditional households. The same kind of cooking vessel, the *handi*, is also used in northern India but its use in food from cats and dogs, it also keeps the food relatively cool by letting the air pass through).

Terracotta Bangles: The production of terracotta bangles is closely related to the production of pottery since the basic techniques involved are the same. Their use in the Indus Valley goes back to the fourth millineium BC in Baluchistan and southern Sind. Few of the terracotta bangles have survived but sherds have been found aplenty and thousands of pieces of broken terracotta bangles are strewen over almost all Harappan locations. One Harappan site, Kalibangan (also known as

Afghanistan is limited if at all.

the Indus cooking pot is the strong, outwardthe Indus cooking pot is the strong, outward projecting rim, which makes it easy to lift projecting rim, which makes it easy to lift the hot cooking pot with two sticks or eventhe hot cooking pot with two sticks or even with the bare hands. This optimum form of with the bare hands. This optimum form of cooking pot remained in use throughoutcooking pot

remained in use throughoutPakistan long after the decline of the Indus



Pakistan long after the decline of the Indus Civilization and is still found in most

traditional households. The same kind of

cooking vessel, the *handi,* is also used in traditional households. The same kind of Civilization and is still found in most



northern India but its use in Afghanistan is cooking vessel, the A Terracotta bangle excavated from Harappa

limited if at all.

***handi,* is also used in**
northern India but its use in Afghanistan is



An article of particular interest and of limited if at all. Peeliwangan) is, in fact, named by the locals after

the color of the huge number of broken terracotta

A ledged shouldered cooking pot with low An article of bangles strewn on the mound (Kalibangan and Pee
particular interest and of

neck and flaring ring. liwangan mean black bangles and yellow bangles, respectively, in the local language).
Toys and Figurines: The use of baked clay

intense speculation is the so-called was not limited to making pottery and bangles, as 'bird cage'. It was recovered by we find other terracotta objects, such as a rich vari
Kenoyer and Meadow at Harappa

ety of toys, quite an extensive recreational para

Some more examples of terracotta toys from various Harappan sites and they describe it in their report.
it would This Mature Indus artifact has been

chheenka
(a

interpreted as a terracotta model of a bird cage by the excavators. But used for the to those who are familiar with the



culture of Pakistan, it would

The modern aluminum cooking pot seem to be a de

appear more like a *chheenka* (a

rivative of the Harappan cooking pot (after Kenoyer)
A ledged shouldered Harappan cooking pot with low neck and flaring ring (top) and a modern aluminum

perforated hanging basket made of

cooking pot (bottom); the latter seem to be a derivative

wood or metal, used for

of the Harappan cooking pot (Kenoyer)

the
temporary storage of milk and

An article of particular interest and of intenserivative of the Harappan cooking pot (after Kenoyer)





The modern



aluminum cooking pot seem to be a de



other edibles. The device protects

speculation is the so-called ’bird cage’. It was re

the food from cats and dogs, it also

covered by Kenoyer and Meadow at Harappa and
The production of terracotta bangles is
closely
they describe it in their reports. This Mature Indus

keeps the food relatively cool by related to the production of
artifact has been interpreted as a terracotta modelletting the air pass through). basic techniques

of a bird cage by the excavators. But to those who
involved are the same. Their use in the are familiar with the culture of Pakistan, it would appear more like a
chheenka
Indus Valley goes back to the fourth
(a hanging basket
millennium BC in Baluchistan and made of wood or metal, used for overnight storage
southern Sind. Few of
of milk and other edibles. The device protects thethe terracotta

bangles have survived but sherds have 369closely pottery

been found aplenty and thousands of pieces of broken terracotta bangles are Bluchistan strewen over almost all



Harappan

A collection of female figurines from Harappa. Similar figu

Terracotta Bangles,A collection of female figurines from Harappa. Similar

rines have been located at Mohenjodaro and other large sites. **figu- rines have been located at Mohenjodaro and other**

large sites. (*Kenoyer*)The production of terracotta bangles is Page 360 related to the production of since the basic techniques involved are the same. Their use in

the
Indus Valley goes back to the fourth

Terracotta toys from Mohenjodaro
Ceramic Technologies! Harappan Civilization - The Material Culture
‘mother
jury is,
of faith or

religious terracotta

largea large men, and other of them are

include
design of
in the around
whistling birds.
and size
Terracotta toy-whistles. These types of toys have been quite popular in Punjab till fifties, before the advent of plastics.

Hollow bird figurine used as a whistle, Chanhu-daro

A collection of terracotta toys from Harappa

and many are, perhaps, home-made. The distinc
tive fan-like head-dress and the elaborate neck
laces which give us an idea of how some of the
women of the Indus Valley looked about five thou
sand years ago.

The children of Moenjodaro and Harrappa
had terracotta toys. The favorite types were human
and animal models, carts, similar to those still in use
in Sindh, birds mounted on wheels, balls, marbles,
models of bullock-carts and animals with movable
heads. Terracota toys include miniature bulls with
movable heads, carts with tiny solid wheels drawn
by a pair of bullocks. such as we still find in reality
with slight change in the design of wheels trundling

along the dusty tracks in the countryside around
considerably more sites of both periods. One distinguishing pattern of distribution is that
Moenjodaro. Other amusing toys are whistling birds.
the terracotta baked pellets are found almost exclusively in the stone-less regions. Thus,
Monkeys, broods of chicken, and pet dogs. Surpris

they are widely distributed in the alluvial plains of the Punjab. Other areas, where stone ingly, the same type of uniformity in form, style, andis generally available, do not show the presence of this artifact. This suggests that a size prevailed in terracotta toys throughout the In

dus land as it did in pottery. Furthermore, just as
Marshall describes one concentration of fifty or more terracotta balls found in a large jar
several forms of pottery survived to this day in Paki

on the citadel at Mohenjodaro: “Two types of sling-pellets are found at Mohenjodaro: stan, the terracotta toys sold in Punjab as late as one round and about the size of a marble, the other, which is more rare, ovoid in shape 1950’s looked as though they had been picked upand averaging 2.5 inches long by 1.6 inches in diameter. This type occurs in all levels. from a Harappan museum. This especially applies Both types are made by hand with varying degrees of finish. In all cases they were to the terracotta whistle-birds.baked. The round pellets may have been propelled by a sling of ordinary type or by

Substitute Stones:
means of a bow such as is used in Sind in the present day for killing small birds"
The urban centers of
the Harappan Civilization were deficient in stone.
Marshall identifies these as sling pellets on the ground that similar objects were used in
Most of the stone required by the Indus artisans and
contemporary western Asiatic cultures. Both ovoid and round sling pellets, for example, architects were 'imported' from the mountainhave been found in early Sumer and Turkestan sites. Marshall's identification was followed by Mackay and Wheeler. Both of the them briefly refer to the evidence as a



Terracotta flat slabs, probably used as artificial flat stone in the region where the real stone was scarce

Terracotta flat slabs, probably used as artificial flat stone in the region where the real stone was scarce

weapon of defense of cities. Wheeler further mentions finding in 1950 a concentration of 98 pellets at Mohenjodaro at the foot of the citadel mound, in the vicinity of the "great granary". Another

pottery. phernalia, and a profusion of female figurines.The female figurines with prominent busts are usually bejeweled. and are shown wearing a peculiar kind of head-dress. Their number suggests that they were cult objects, probably associated with the fertility cult, and as such, they are commonly called 'mother goddesses' in archaeological literature. The jury is, however, still out on this score and it is not certain if these female figurines were the articles of faith or aesthetics and if there in fact existed a cult of fertility in the Harappan religious thought. These figurines, as religious symbolism and art objects, are to be discussed in the next volume (Volume IV: *The Theoretical and the Abstract*) in context with the Harappan religion and art, respectively. The terracotta figurines were not confined to the depiction of large-busted women, a large number represent men, animals, carts and other items, many of them are obviously toys. These were easy to make

concentration is said to have been found near one of the gateways of Kalibangan. None of these excavators, however, considers the further implications of these deductions, nor discusses the questions in much detail. Only Marshall, with his extraordinary gift for seizing upon the significant detail among the mass of material he had to deal with, notes a little further on in the same passage as the one quoted above:

"The sling probably originated in stony country where ammunition would be plentiful. When its use extended to alluvial countries the pellets would naturally have been made of pottery. It is essentially a weapon for open country, and in the hands of a skilled man it is a formidable weapon".

The present rural practices in Sind and Punjab support Marshall's observations on the use of terracotta sling balls. In Sind, young boys still use pellets made of clay, with a



“Terracotta cakes” or “substitute stones”: threy are found in almost all Harappan cities. Their precise use is, however, not known

ranges in the west. In certain cases this deficiency was covered by manufacturing stone substitutes. An obvious example of this is to be seen in the Indus grooved pottery which must have taken the place of stone mortars for undertaking some light duty jobs. Another case for such a substitution is a large number of objects, which archaeologists are accustomed to calling ‘terracotta cakes’. These are flat round-edged triangular objects of several different sizes. Furthermore, there is the case of the socalled ‘sling-balls’. All these onjects are specific to the Mature Harappan sites and are absent from the earlier or the later sites. They are also absent in earlier or later levels at the same sites, nor did they exist, with certain exceptions, in contemporary cultures of adjacent regions.

A peculiarity of the triangular terracotta cakes is that they are generally found in association with wells, bathrooms and latrines. However, they are recorded as having been used as infilling, with and without charcoal, beneath brick-paved floors, as hard core for street building as well as a wholedouble stringed bow for hunting birds and other small animals. The terracotta pellets are range of other situations, all of which suggest diver

the Hardpans crops and fruit trees. Since the Hardpan
baked in open fire by just throwing them into the hearth where their mothers are baking sity rather than specialization. Their presence in
inhabitants of the plains did not have any stone, the the flat bread or cooking the stew. In Punjab, the terracotta or unbaked clay ‘slinghearths at Kalibangan may be noted as an ordinary
slkingstones were made from clay and then baked.
stones’ are regularly used to scare the knots of parrots and sparrows from the fields

element of support. They also occur in large numduring the harvesting season. Here they are used as a cluster of several pellets thrown bybers at Allahdino and, although in smaller numbers, a cup-sling. The people in Pothowar use these terracotta sling-stones, here generally of at sites in Gujarat. The almost universal and par

ticular association of the triangular terracotta cakes larger size, to chase jackals
with the riverine plains of the Harappan Civilizationand hyenas away from the
has led some scholars to conclude that they had agrazing herds of goats and
special significance in connection with ritual bathingsheep. Thus, it appears that the
or other ablutions. Bridget Allchin has speculated onofsuch a use and feels that this was altogether tooterracotta ‘sling-stones’

several sizes have been a narrow a view of their role, especially when considstandard equipment for theered as part of a whole range of baked clay objects

produced in large quantities. Bridget Allchin regards herdsmen and the agriculturists
them instead, together with other terracotta nodules Valey.
produced in fairly large quantities, as substitutes for This also provides a possible
stone. It is from this basis that certain other, moreinterpretation of their presence
specific uses of terracotta cakes, pellets, etc., can
be considered.

in graves, along with other
small objects.

Another interesting article of terracotta is the
so-called “sling ball” which is found in large number
at several Harappan sites. Effectivemustarrowgo and

spear heads of either metal or stone are absentcredit for

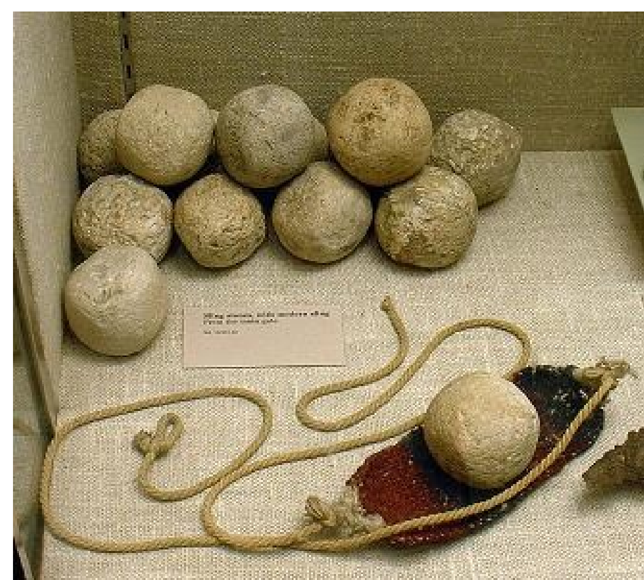

Bridget Allchin, to whom the
Making of sling-stones for hunting of birds in Sind
Making of sling-stones for hunting of birds in Sind. the
Slingstones are still used by the farmers of the Punjab and Sindh to ward off birds. Off their fields and fruit from Harappan sites, but these sling pellets have
pondering over the ‘substitute stones’, observed the excavated site of Rehman Dheri in **trees.**
been recorded at both Early and Mature Harappanthe Derajaats which survived through three
unbroken urban occupation that ended sites by Marshall, Mackay, Wheeler and others.
somehow mysteriously around the beginning of the Harappan Phase in the adjacent
are found at Mohenjo-daro: one round and about
More recently their presence has been noted at aIndus plains. She also noticed a small Harappan site,

Hisham Dheri, several hundred considerably more sites of both periods. One distin
the size of a marble, the other, which is more rare,
meters to the northeast. This site seemed to be dedicated to the production of sling-balls
guishing pattern of distribution is that the terracotta
ovoid in shape and averaging 2.5 inches long by 1.6 and the triangular terracotta cakes. Allchin explained this situation by visualizing the
baked pellets are found almost exclusively in the
inches in diameter. This type occurs in all levels.
site of Rehman Dheri, protected by a defense wall, besieged by the Harappans who
stone-less regions. Thus, they are widely distributed
Both types are made by hand with varying degrees
attacked the city with the terracotta sling-stones and Harappan triangular cakes as
in the alluvial plains of the Punjab. Other areas, of finish. In all cases they were baked. The round
where stone is generally available, do not show the
projectile weapons, the open-air sling-stones factory nearby continuously providing the pellets may have been propelled by a sling of ordi
nary type or by means of a bow such as is used in
presence of this artifact. This suggests that a substi
'ammunition'. It is an interesting thought but in all appearance the sling-stones were
Sindh in the present day for killing small birds".
tute for stone must have been sought by the plainmost likely used by the Harappans in the pursuit of their herding and cultivating dwellers.
Wheeler also mentions finding in 1950 a concentraactivities, just like they have been used in Sind and Punjab up to recent times. at the foot ofMarshall describes one concentration of fifty tion of 98 pellets at Mohenjo-daro

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citadel at Mohenjodaro: "Two types of sling-pellets
ary". Marshall notes a little further on in the same passage as the one quoted above:"The slingPottery for everyday use was probably manufactured in every Indus settlement and

certainly in all the towns and cities, although plenty of evidence is available of pottery being manufactured in specific workshops and in quantities. The range of these locally made pots included round-base cooking pots, storage vessels, plates, bowls, cups, and presentation stand. Some pots were molded by hand but the majority were made on a


Slingstones were a common weapon of war in the Bronze Age Mesopotamia. In the Harappan Civilization, they

probably originated in stony country where ammunition would be plentiful. When its use extended to alluvial countries the pellets would naturally have been made of pottery. It is essentially a weapon for open country, and in the hands of a skilled man it is a formidable weapon".

Another concentration is said to have been found near one of the gateways of Kalibangan. None of these excavators, however, considers the further implications of these deductions, nor discusses the questions in much detail.

The present rural practices in Sind and Punjab support Marshall's observations on the use of terracotta sling balls. In Sind, young boys still use pellets made of clay, with a double stringed bow for hunting birds and other small animals. The terracotta pellets are baked in open fire by just throwing them into the hearth where their mothers are baking the flat bread or cooking the stew. In Punjab, the terracotta or unbaked clay 'sling-stones' are regularly used to scare the knots of parrots and sparrows from the fields during the harvesting season. Here they are used as a cluster of several pellets thrown by a cup-sling. The people in Pothwar use these terracotta sling-stones, here generally of larger size, to chase jackals and hyenas away from the grazing herds of goats and sheep. Thus, it appears that the terracotta 'sling-stones' of several sizes have been a standard equipment for the herdsmen and the agriculturists throughout the Indus Valey. This also provides a possible interpretation of their presence in graves, along with other small objects.

Bridget Allchin, to whom the credit must go for the pondering over the 'substitute stones', observed the excavated site of Rehman Dheri in the Derajaats which survived through three unbroken urban occupation that ended somehow mysteriously around the beginning of the Harappan Phase in the adjacent Indus plains. She also noticed a small Harappan site, Hisham Dheri, several hundred meters to the northeast. This site seemed to be dedicated to the production of sling-balls and the triangular terracotta cakes. Allchin explained this situation by visualizing the site of Rehman Dheri, protected by a defense wall, besieged by the Harappans who attacked the city with the terracotta slingstones and Harappan triangular cakes as projectile weapons, the open-air sling-stones factory nearby continuously providing the 'ammunition'. It is an interesting thought but in all appearance the slingstones were most likely used by the Harappans in the pursuit of their herding and cultivating activities, just like they have been used in Sind and Punjab up to recent times.

Organization of Ceramic Production: Pottery for everyday use was probably manufactured in every Indus settlement and certainly in all the towns and cities, although plenty of evidence is available of pottery being manufactured in specific workshops and in quantities. The range of these locally made pots included round-base cooking pots, storage vessels, plates, bowls, cups, and presentation stand. Some pots were molded by hand but the majority were made on a wheel as throughout the whole range of forms, flat bases are dominant, and many show the string-cutting marks of their removal from the wheel. These products were very similar from city to city and region to region, not only in form and shape but also in sizes. Surprisingly, the shape, form, size, and decoration changed very little over time, a span of about 700 years.

The close similarity of form and decoration in pottery across Harappan sites makes us wonder who the potters were, how the manufacture of pottery was organized, and above all, how this uniformity over such a vast area and over such a long period of time was achieved. As discussed elsewhere in this book, the uniformity of the Harappan artifacts has been linked to trade as well as the control of raw material and distribution by the state or the merchant elite. This may have some element of truth but the products of the potters wheel were locally made and the raw materials were locally available. There was thus no question about the control of pottery production through the control of raw material or through the mechanism of distribution. Pottery is not an easily transported item and to suggest that the uniformity was due to 'trade' is awkward, and in any case leaves open the question as to why more than one range and quality of pottery was not traded. The uniformity of potter's wheels or equipment cannot also supply the answer, even though it may have played a substantial role.

Ratnagar (34) argues that bricks were of uniform size not because of trade in them - such trade in heavy and bulky item could never have been lucrative - but because people were mobilized to mass-produce them. It appears, therefore, that a substantial portion of pottery was manufactured under state's or potter's guild supervision who maintained certain standard of form and size. Such an evidence is in fact available: one such workshop has been found in the town of Naushahro in Sindh, where flint blades used for turning and scraping the vessels had been left when the workshop was, for some reason, abandoned. The potters had also left shelves of finished pots – once dry, these would have been decorated and then fired in the adjoining yard. The workshop consists of a small structure with several rooms, with a pillared verandah on one side open to a lane. The pots were most likely made in the center of the workshop and fired on the outside. Individual workshops of this type probably specialized in particular types of wares which included more complex shapes and articles of mass consumption. This explanation, although appealing to logic, does not jive with intuition. We know that in the Harappan phase the presence of state (or states) could have been only very rudimentary; this loose political structure could not have been capable of imposing such an effective control over a craft for which the state neither controlled the raw material nor the distribution of the ware. Since the technology was simple, the state could not have imposed its will through the control of technology either extensive uniformity in pot-making technology over such a large geographical area. Furthermore, sealings or graffiti is not present on these wares. This evidence indicates that pottery-making was not directly controlled by the state or the ruling elite of larger cities.

Another explanation for uniformity and standardization of pottery stems from the possible hereditary nature of occupation, as it is today in Pakistan as well as in India. If the son learns the art from the father, who had in turn learnt it from his own father or uncle, soon an entrenched tradition is bound to develop. If any of these potters moved to another location, he or she would carry this tradition with him or her. Thus, not only the uniformity of production techniques is achieved over a large area for

long period of time, but also the forms and styles. Such is, indeed, the situation in modern Pakistan where the style, form, and paintings on pots (blackon-red) are uniform all over Punjab as they have been for centuries past. This explanation seems to be more readily acceptable, especially when we observe a general tendency of cultural conformity in the Harappan society over the entire span of the Indus Civilization.

Our best evidence with which to discuss the organization of production is a ceramic production area that was discovered on the northwest corner of Mound E at Harappa. It included a two-chambered kiln and various production tools as well as pit kilns, some of which had been in use before the Urban period (15). A mudbrick wall is associated with the workshop. Although excavations are incomplete, the wall most likely was part of a residential building similar to those excavated in other locations in the city. No record-keeping devices such as seals or weights and measures were present. In addition to the two-chambered kiln, there were two other small pit kilns associated with the workshop. One of the kilns was contemporary with the two-chambered kiln. The kiln was constructed several hundred years earlier, suggesting that a group of specialists had produced clay objects in this location over a period of several hundred years (22). They began with small-scale production in the Pre-urban settlement and later intensified during the Urban period. The continuous use of the area for ceramic objects implies that the site was handed down over successive generations of potters. The evidence is consistent with an independently operated workshop handed down from generation to generation as a family-operated *craft*.

The excavations at Harappa Mount E, referred to above, gives weight to the speculation that the production of some crafts were organized on hereditary basis, akin to the caste system of the Hindus in India, that this socio-economic system may have indeed originated in the Indus Valley during the third millennium BC, and it may have been introduced to India during the expansion of the Indus people into the Indo-Ganghetic Divide during the second and the first millennium BC. This hypothesis draws additional strength from the concentrated pockets of specialized crafts at several Harappan sites and the existence of sites that are routinely called in archaeological literature as ‘factory sites’.

Ethnographically, no single pattern accounts for how family-operated workshops are organized, but in general, all members of a family participate in production in one way or another. For example, adult males may procure clay and produce the pots using a potter's wheel or hand-building methods, while adult females process the clay and paint the pots. Everyone in the family, including children, assists with loading the kiln, firing the pots, and storing and marketing them (22). Although not necessarily the case for the Harappan workshop, in many family-owned potteries, farming and pastoralism are also part of the family's seasonal occupations, and the production of pottery (or some other work) is timed to coincide with periods when agricultural work is slow. These arrangements would have the advantage of spreading risks within the family, providing them with products for internal consumption and for exchange.

STONEWARE

Stoneware is essentially a terracotta object fired at high temperatures under reductive atmosphere and thereby rendering it very dense and strong. Only stoneware bangles have been produced through this technology; no other type of stoneware object has been recovered from any Indus site so far. These bangles were restricted in access to the major cities of Mohenjo-daro and Harappa, although a few have also been found at the site of Balakot (24) .

Stoneware bangle production was truly innovative because it took advantage of previously known techniques usch as selecting and processing specially refined clays and reduction firing (25). With minimal changes, potters altered conditions in kilns and created an entirely new product. The secrets of its production were lost until archaeologists reconstructed it. Perhaps because of the specialized technology involved in their manufacture, which most likely was scrupulously guarded, we assume the stoneware bangles were among the Harappans most highly valued possessions. Unlike most other bangles produced from different raw materials, many of the stoneware bangles bore personal inscriptions (or sacred word), etched onto their exteriors before and/or after firing (26).

Harappan stoneware bengles are high-quality ceramic ornaments that are unparalleled in ancient world. While stoneware vessels have been found in the ancient Near East, no stoneware bangles are known from outside the Harappan cities. Harappan bangles of good quality, although unglazed, fully meet the standards of current definition for this category of ceramics. Possibly, this industry was developed before the Harappan Phase, as Vidale observed many partially sintered grayish bangles on the surface of Juderjo-daro and Thomas (27) describes similar bangles from the site of Lewan that dates to the Early Harappan phase. Kenoyer also noticed thin, heavily reduced ceramic bangles in the Early Harappan levels at Harappa. He found in Mound E a small kiln dateable to Period II where small ceramic objects and possibly bangles could have been fired in reducing conditions (28,29).

Stonewarebangleswereproducedfrom highly refined clays under strictly controlled temperatures and atmospheric conditions (26). The same impulse to break down, recreate, and transform materials, discussed in the preceding chapter, was achieved through a complex process in which



at clay from of chemical at Mohenjo deposited in river waters

A red stoneware bangle with no inscription

s tabJish that ndMohenjo
ical groups t a still uni-

the clay was highly refined through levigation (30). Comparison with latter porcelain technologies could
ity of stone- 0, where as
suggest that such a fineness was obtained with complex and long techniques of decantation, but
, given the this pattern
most probably in the large alluvial plains of the Indus Basin it was relatively easy and inexpensive to
tion, these
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select clay fractions which could be kept in suspension within tanks, jars or simply in holes dug in the ground. The experiments conducted by Kenoyer

the Indus
ld be kept
and a local potter have been able to replicate the types of fine clay used in stoneware bangle produc
Ie to repli
(Kenoyer
tion using decantation (31).

Schneider's (32) Iclay cylin~ suggest that these objects ir surface
were formed with molds but Bhan et al (33) disagree with this assessment. According to them, the refined clays were shaped into bangles by throwing

ld explain
g-shaped
hollow clay cylinders on a potter's wheel and subsequently grooving or cutting them from the cylin
s.
lenjoDaro
der. The bangles were hardened in air, returned to the wheel where they were refined with tools and
piled, of
otta rings

then fired in cylindrical pottery containers, which were stacked and encased in a large jar. Firing in airtight sealed containers provided optimal control ructures,
of atmospheric conditions and attainment of higher temperatures. The final product reveals a hard, uniformly textured surface that when broken has a glass-like fracture. This reconstruction is supported by Xero-radiographies of some bangles and experimental replicas of the forming process carried out by a professional potter in collaboration with Vidale (33). This technique would explain the extremely regular fashion of the bangles, the asymmetry of their section (egg-shaped to triangular) as well as their high degree of dimensional standardization

The bangles were produced in two colors. The black-gray bangles were fired in a reducing atmosphere in the sealed containers. These strong reducing conditions lowered the melting temperature, sintering the clay and giving the bangles a shiny metallic luster (26). In order to create red products, the potters used different clay compositions, fired the red bangles at lower temperatures, or altered atmospheric conditions by opening the firing containers.

A stoneware workshop at Mohenjo-daro was discovered in an abandoned residential area of the city that had been reoccupied by stoneware artisans. There are post holes (wood stains in the soil), indicating that the artisans erected wooden structures within the walled areas of an abandoned residential compound, thereby enclosing the workshop space. Within the workshop's walls were

found storerooms, collapsed brick walls of kilns and dump heaps. The dump heaps included pieces of kiln lin

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Mohenjo
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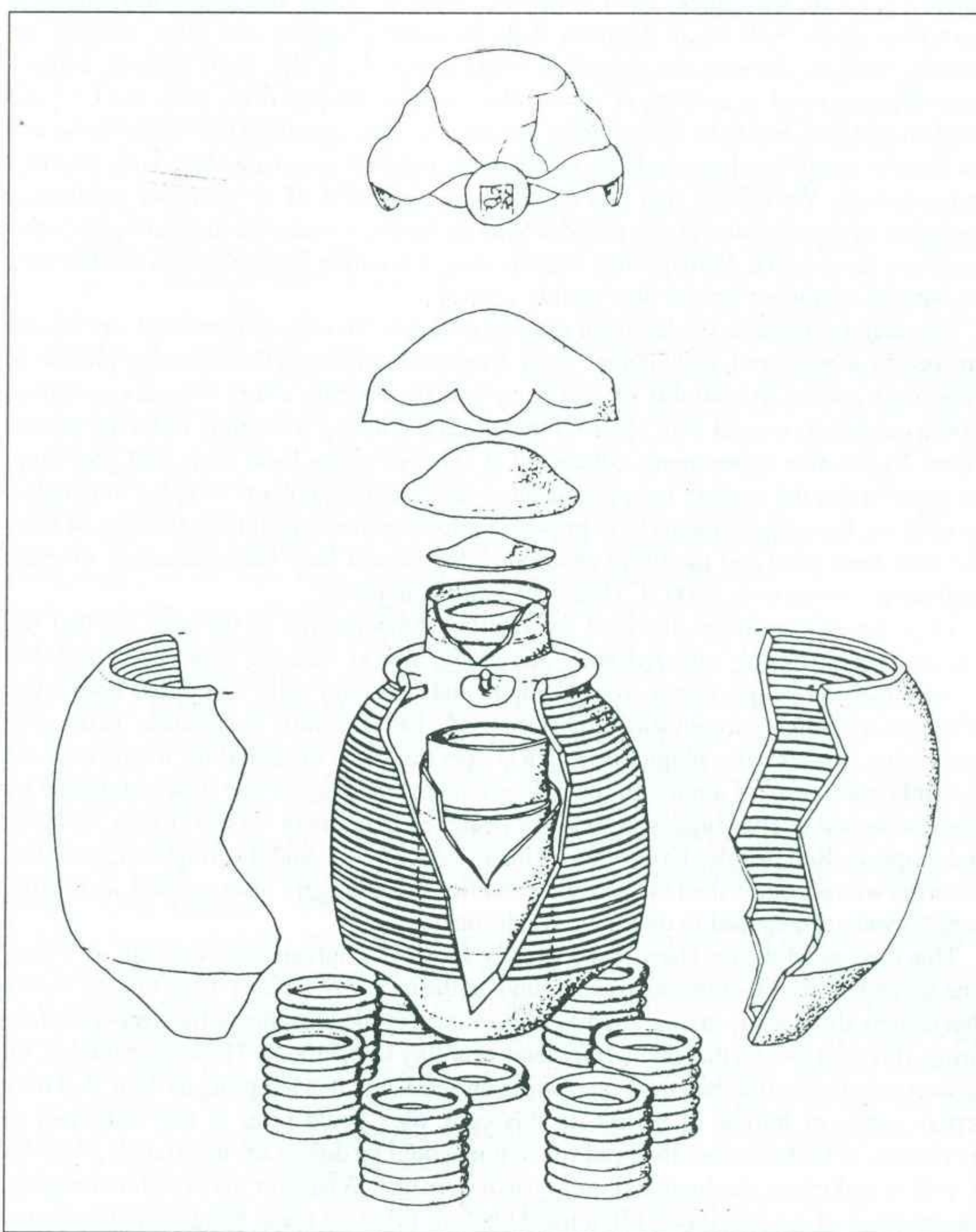


Fig. 5. Diagram of canisters and containers for Stoneware Bangle Firing, after Halim and Vidale 1984, Fig. 63.

Fig. 5. Diagram of canisters and containers for Stoneware Bangle Firing,

Diagram of canisters and containers for Stoneware Bangle Firing, (*Halim and Vidale* **)**

ings, vitrified ash, overfired bricks, and the containers in which the bangles were fired. The kilns were large and rectangular in shape and contained a suspended "grid" with holes (26). The artisans reused bricks and preexisting walls to make their kiln. Since the kilns were not excavated, it is unclear whether the stoneware bangle kiln fits with any of the kiln types illustrated in the above figure. The manufacturing operation performed in the workshop identified at Mohenjdaro included also the fabrication of small firing containers or saggers in which 2 or 3 bangles were inserted, or larger saggers in which the smaller ones with the bangles were piled, of different types of pottery lids, and the production of thousands of coarse terracotta rings which were used for separating the bottom of large saggers from the kiln's floor (35).

Although, so far, no workshop area has been identified at Harappa, HARP team establish that the stoneware bangles were manufactured with local clays both at Harappa and Mohenjo-daro. Curiously, the majority of stone-ware bangles found at Harappa appear to have been made at Mohenjodaro, whereas no bangle with the Ravi river clays, distinctive of Harappa, has been found at Mohenjodaro. The relationship between the two sites is therefore asymmetrical, and, given the fact that both cities had their stoneware workshops, it is difficult to explain this pattern of distribution in terms of trade

About 100 ceramic samples connected with this industry were chemically analyzed by Blackman and Vidale (30) by Neutron Activation. These samples include fragmentary stoneware bangles, kiln fragments and pieces of firing containers from Mohenjo-daro, and more clay and bangle samples from Harappa. This research showed that clay from Mohenjo-daro and Harappa are relatively easy to distinguish in terms of chemical composition. A possible reason for this difference is that the Indus clays at Mohenjo-daro, and Sindh in general, would show major concentration of elements deposited in the forms of soluble salts, due to the higher rate of cumulative evaporation of river waters along its course.

The uniform narrow interior diameter of these stoneware rings, 5.5-6 centimeters, suggests that they may not have been worn as conventional bangles on the wrist or ankle, particularly if their wearers were men; instead they may have been sewn onto clothing or worn as a pendant or on a belt. The Priest- King statue, wears a circle in the center of his head- band, and another on a band on his upper arm: if the statue were life-sized, these rings would match the stoneware bangles in size. (However, there are other possible interpretations of the rings worn by this sculpture: A gold bead with steatite inlay, found at Harappa, is also similar, though its proportions are different.) The stoneware bangles were produced in some quantity (ten in each container, and probably a number of containers in each kiln firing), suggesting that they were worn by more than one individual: It seems likely that they were badges of office held by leading members of the hierarchy. The fact that the bangles themselves were inscribed is also suggestive of an official function. Their use was almost exclusively confined to Mohenjo-daro and Harappa, regional centers of power and administration where one would expect to find symbolic objects that identified the holders of high office

FAIENCE

There is no true glass from the Indus Civilization, but by 2600 BC, like Egyptian and Mesopotamian, Indus Valley artisans were able to create a glassy or vitreous paste commonly referred as 'faience'. It

reached a high level of production and approached the quality of early glass (36-39). While many techniques were similar, each cultural region developed its own style of ornaments and technologies for producing them. In essence, faience was a synthetic material, an imitation gem, popular in the Indus Valley as in Central Asia, Mesopotamia, Bahrain and Egypt. A large number of faience specimen have been found in these regions and thoroughly analyzed. A variety of things such as miniature con



A double-sided faience tablet with inscription, probably used as an amulet

tainers, beads, bangles, buttons, seals, amulets and figurines were made of faience. It has a hard fine granular body covered with a glaze. The prevailing colors range from blue to green although white, brown and red specimens have also been found.

A wide variety of faience ornaments including beads, bangles and jewelry have been retrieved from the major ancient cities of Mohenjo-daro, Harappa, Chanhu-daro, and Dholavira. Recent excavations at Harappa have revealed the faience beads from the early levels - settlement dating to 3300 BC, but the production of elaborate faience

ornaments, figures and vessels are more prevalent

during the Harappan phase.forms of pottery survived to this day in Pakistan, the terracotta toys sold in Punjab as

The ancient artisans of the Indus Civilization crons (very few had particles larger than 50 mi

appear to have almost exclusively utilized effloreslate as 1950's looked as though they had been picked up from a Harappan museum. cence, a technique wherein the color of the glaze is ture resembles talcum powder. strongly bonded with the underlying body. RecentThis especially applies to the terracotta whistle-birds. Thediscoveryofwhiterockquartzand

studies show that efflorescence itself has variations quartzite fragments at Harappa suggests that it may and can be divided into two processes based on

Faience: how quartz is prepared. In one process, the faience

have been a major source for silica powder used in making faience objects. Other minerals found in Harappan faience included alumina, sodium and potassium, and since these are not found in large quantities in natural quartzite, they must have deworld is known to have produced this type of glassy

Ceramic Technologies !faience referred to as compact faience. It is made of

extremely fine evenly colored glassy powder that

has a high percentage of glass and fine grains of  **Three monkeys in embrace, cast in faience**

Three monkeys in embrace

paste is made from powdered quartz combined with

There is no true glass from the Indus Civilization, but

mixed with the silica. The sodium and potassium

there is much faience. Faience was a synthetic material, an

used for glazing and glass production in South Asia.

imitation gem, popular in the Indus Valley as in Central

production in Pakistan, especially in Multan area,

Asia, Mesopotamia, Bahrain and Egypt. A large number

derived from the burning of desert plants generally

of faience specimen have been found in these regions and

loxylon recurvum; H. multiflorum, Sal-solafoetida,

thoroughly analyzed. A variety of things such as miniature

Kenoyer (31) with fine ground frit and *sajji* demon

strated that no additional adhesive or gums arecontainers, beads, bangles, buttons, seals, amulets and

necessary for forming difficult objects such as ban

figurines were made of faience. gles or tiny vessels. Another type of flux used in

glazing is naturally occurring sodium carbonate/
bicarbonate, commonly referred to as natron (Urdu

The technology Traces of calcium in some Harappan faiencefor producing high faience may have beenphate, also a flux and probably a component of

quality may be due to calcinated bone or calcium phosestablished by

white faience, since *sajji* or *khar* creates a greenish

Harappa, but this did not become a common technology

The process of making faience in the Middle

until some 200 years later, during the middle of the urban phase.

basically obtained out of a pulverized mixture of

One could

silicates, i.e. quartz, to which magnesium and some

even argue that
developmentboth flux and colorant. In the second process, theof the
faience technologymetal oxides were added. Set in a mould and
given

powdered quartz is partially melted with a colorant
a glaze, the mixture was fired at very high tempera

was to be seen

to produce
ture, in access of 1000 degree centigrade, so that

during the later part of the Harappan Civilization, aroundsome of the ingredients melted and held the rest der. This fine glassy powder, already colored, is together to produce the desired article in faience.mixed with additional flux to prepare faience paste.2000 BC, when it may have intersected with the emergence Indus faience was, however, made by a techniqueAdding fine ground quartz increases the volume, different from that used in contemporary Egypt andbut also results in a reduction of color homogeneity.of glass technology. This is in parallel with some other Mesopotamia, giving a stronger and translucentFaience objects made by the first process tend to

Three monkeys in embrace material of uniform texture.have larger quartz grains (50 to 100 microns) and

from Mohenjodaro technologies, such as gold and copper working, shell bangleCopper, iron or manganese are also found inon close examination a speckled color distribution. minute traces in Harappan faience and althoughUnder low magnification (20X) its granular character making, agate bead making or even seal carving techniquesthey help to lower the fusion point of silica, their is discernible in objects where the glaze is eroded primary function appears to have been for color.or where a broken edge reveals the object's interior which were known to the Indus people during the Kot Diji Most faience of the ancient world, including the Incore. This paste produced small tokens as well as a dus cities, was colored with copper minerals to prowide variety of beads. A similar coarse grained faperiod, but the elaboration of these technologies did not duce blue-green glazes. However, the Harappans ience was commonly made in Egypt and Mesopodeveloped special techniques to produce glazes oftamia. Most faience objects - bangles, tiny beads,begin until after 2600 BC, during the Harappan Phase. pure white (from calcium), deep azure (from copper miniature vessels and animal figurines - were pro duced using the second process, resulting in a hoFaience was widely used at Harappa but has been reported and red-brown (from iron minerals) and brilliant redmogenous, compact structure with a high percent(colorant unknown). These glazes were usually age of glassy matrix. No other region of the ancient from Mohenjo-daro, Chanhu-daro, Lohumjo-daro, Harappa, and Lothal also. [376]

minerals), black (from manganese), yellow, brown

The process of making faience in the Middle East has been



used with one or more colors and reflect an intimate knowledge of the temperatures needed to melt silica as well as the atmosphere (oxidizing or reducing) for obtaining specific colors (31).

One of the important questions about faience technology is the type of adhesive used to hold the ground quartz together during forming process. In experiments conducted by him Kenoyer tried numerous adhesives which included honey, mustard oil, clay, gum of *shisham* tree *(Dalbergia latifolia)* and gum tragacanth. *Shisham* gum proved to be one of the best adhesives since it did not shrink. He is of the opinion that it is possible that the Harappans used no adhesives at all because of the extremely fine powder that was used and when combined with water and the soapy alkaline mixture of *sajji* and natron, the fine quartz was malleable enough to from delicate shapes. Even during drying, the paste remained quite strong and it is possible to scrape and incise the surface with intricate designs.

The technique of making compact faience continued after the Indus Civilization ended and set the foundation for the development of glass technology of later Early Historic period *(ca.* 600 BC). The famous *meena-kari*, enamel on gold and silver, which is still practiced throughout India, may also have roots in the early experiments with glazed faience inlay in gold.

The technology for producing high quality compact faience may have been established by 2800 BC at Harappa, but this did not become a common technology until some 200 years later, during the middle of the urban phase. One could even argue that the ultimate development of the faience technology was to be seen during the later part of the Harappan Civilization, around 2000 BC, when it may have intersected with the emergence of glass technology. This is in parallel with some other technologies, such as gold and copper working, shell bangle making, agate bead making or even seal carving techniques which were known to the Indus people during the Kot Diji period, but the elaboration of these technologies did not begin until after 2600 BC, during the Harappan Phase. Faience was widely used at Harappa but has been reported from Mohenjo-daro, Chanhu-daro, Lohumjo-daro, Harappa, and Lothal also.

REFRACTORY CERAMICS

Although not much work has been undertaken on the refractory ceramics produced by the Harappans, it is clear that this category of ceramics was crucial to technologies such as steatite firing, stoneware bangle production, faience production and metallurgy.(see below). Refractory clays appear to have been produced by the inclusion of chaff, grog and sand tempers. Cooking vessels at many sites have refractory slips on the exterior to protect the vessels from thermal shock. Containers for stoneware firing were coated with a thick layer of chaff tempered clay to keep the containers from melting under the intense heat of the kilns. Crucibles to melt frit for faience making, for firing steatite, and also for melting of copper and bronze were made from special clays and selected vegetable and mineral tempers. Refractory ceramic vessels are closely associated with primary production areas and are important for understanding the organization of these technologies and their role in the socio-economic structure of Indus cities. This field of research is extremely important because it is connected to some of the most important technologies that were controlled and exploited by elite communities of the urban centers.

CONCLUSION

The Harappan pottery corpus is varied one; it demonstrates that it had great popularity in a wide variety of uses. Dish-on-stand vessels with narrow tapering bases, beakers, pointed-base jars, handled cups, jar stands, and perforated cylindrical vessels are noteworthy in addition to the variety of vases, pans, and plates conventional to these early cultures. The painted pottery is characteristically black on a red background, and its motifs are equally divided between geometric and naturalistic, with trees, birds, fish, and animals in the latter category rather exuberantly displayed. The painted pottery is, however, a minor part of the total assemblage. In general the pottery is florid, heavy, and well made. It is in great contrast to the delicate vessels of preHarappan cultures.

The Harappan terracottas are rich in human as well as animal figurines, which may have some religious significance but are more likely dolls and decoration pieces. Harappan cities also abound in terracotta toys, which include whistles, shaped in the form of birds and several types of rattles. Toy carts are especially interesting. The design and the theme of Harappan toys have been so overpowering that one could see the replicas produced and sold all over Punjab and Sind as late as the middle of the last century.

Technologically, the rapidly rotating potter’s wheel, the double-decker firing kiln, the organization of mass production, and the use of commonly available slips and decorating colors (generally black) are worth noting. Otherwise, the Harappans did not seem to further the art of pottery to any

significant degree, neither in form and shape nor in decoration and colors, over and above what had been achieved earlier in various regional cultures. The Harappan pottery is robust and utilitarian in nature compared to the delicate and aesthetic objects of the previous cultures.

It appears that in an area of extensive alluvial plains, where stones are difficult to find and costly to transport, most of their functions were taken over by baked clay. Thus, for instance, Terracotta sling balls were used by the Harappan people to keep the wild animals at bay or flocks of voracious birds away from their grain fields. A vast quantity of terracotta cakes suggests not only their use as toilet items, but also as props for household furniture, and as supports and fillers between the stacks of unbaked pottery put in the firing kilns.

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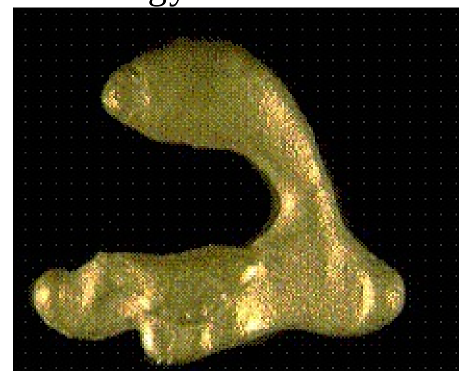
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Chapter 17

Metallurgy and Metal Artifacts

Metallurgy and Metal Artifacts
Chapter 13
Metallurgy and Metal Artifacts


A small gold nugget from Harappa (from Kenoyer)

A small gold nugget from Harappa (*HARP*)

Harappan Civilization, The Indus Civilization belongs to the Bronze Age. of the artifacts as well as their widespread distribuThat is, it is a time when people had started totion. There is nothing tentative about Harappanlearn the use of copper and its alloys in their daily
the Bronze Age, is not metallurgy either in its range of tool types and other life. While the bulk of tools were still made of known for a wideobjects or in the variety of both alloying patterns stone, tools made of metal now began to play a

key role, not only because they could withstand
spread use of metals. and metals used. The catalogue of metal objects The use of copper,high pressure without breaking, but also because Mohenjo-daro, Harappa, Allahdino, andthey could help cut stone tools. Similarly, somefrom bronze, gold, lead,articles of daily use began to be made of metal Chanhu-daro may be short but it is adequately rep and silver was known
instead of stone or pottery. A standard range of resentative: vessels, axes, arrowhead, knife or dagbut rathertools made of copper and bronze is recorded at ger, razor, saw, sickle-shaped blade, fish-hook,site after site. Many among them set the patternchisel, awl and reamer, needle, drill, bolt, scale-pan
for later tool types for centuries to come, and the and scale-beam, mirror, spatula, finger-ring, ear
There is no evidence
for the use of iron as it
majority exhibit what Piggott called 'competent
dullness' - a simplicity of design and manufacture, linked with adequate but not great
was not anywhere else ring, bangle, jar-handle, bull, bird, bead, casting,

functional efficiency. at the time. Stone and chain, and the famous dancing girl from Mohenjoterracotta, along with wood, leather, and bone stillThat metals played a very significant role in the economic life of the Harappans is daro. Pins with single or double spiral heads, which
revealed by the presence of a large number of metal objects in the material remains of
remained the materials of choice for making utility were once thought to have been more common intheir cities. Excavations produced almost 2000 metal artifacfs at Mohenjodaro and over
products as well as weapons and implements. NevCentral Asia, have now been found at a number of1000 at Harappa alone. No

doubt if more detailed excavation techniques had been used,
ertheless, quite a few metals began to come in use, Indus sites. The details of typology do not interestand all the more fragmentary metal examples recorded, the count of metal artifacts of which copper and its alloys, the bronzes of variwould have been even larger. Even the small Harappan site of Allahdino has a us here, but as a group this is a distinctive assem

ous compositions, was most common. Razors,tremendous number of metal artifacts. If we consider the range of metal tools atblage without specific parallel.different sites, we find that small settlements like LothaI and Allahdino were rich in

chisels, knives, spear heads, hooks, and saws, Oddly enough metal crafting is one of themetal tool types, even if Amri was not. More important, craft towns like Chanhu-daro
made of copper have been found in larger Indus least studied craft traditions of the Indus Civilization.had metal tool types comparable in range of form to those recovered at Mohenjodaro
cities. Bronze sculptures are represented by the Although we have numerous metal objects, few ob"dancing girl" from Mohenjo-daro. jects have been subjected to metallurgical or comThe copper-bronze metallurgy of the Indus Civilization is considered impressive due to

the quality and variety of the artifacts as well as their widespread distribution. There is
No doubt, gold, because of its natural availpositional analysis. Fewer analyses have beennothing tentative about Harappan metallurgy either in its range of tool types and other
ability, was probably one of the first metals to be done on the ores, slags, and ingots from Indus
objects or in the variety of both alloying patterns and metals used. The catalogue of
used by man. In the Greater Indus Valley, beads of
gold and one gold nugget have been found atrepresentative: vessels, axes, arrowhead, knife or dagger, razor, saw, sickle-shaped
sites. The study of ores from a variety of possiblemetal objects from Mohenjodaro, Harappa, Allahdino, and Chanhudaro, is adequately sources available to the Indus metalsmiths have
Mehrgargh as early as the seventh millennium BC.blade, fish-hook, chisel, awl and reamer, needle, drill, bolt, scale-pan and scale-beam,also been neglected.
mirror, spatula, finger-ring, ear-ring, bangle, jar-handle, bull, bird, bead, casting, chain,
Silver makes its earliest appearance in the Mature
Harappan Civilization. That it was relatively more
Historical Context: Scholarship in the first
and the famous dancing girl from Mohenjodaro. Pins with single or double spiral heads, half of the 20th century held that the emergence ofwhich were once thought to have been more common in West Asia, have now been
common than gold is indicated by the number offound at a number of Indus sites. The details of typology do not interest us here, but as a metallurgy was central factor in the development of large vessels made of silver, and by the frequency

of other finds.The Indus cities also provide testi

mony for the occasional use of lead - often found in
association with silver. Lead objects, such as vases
or plumb bobs have been found. Arsenic, antimony
and nickel were also used by the Harappan people
but only in alloys with copper and it is these alloys

for which the Harappan Civilization is better known.

Besides the use of native gold, the earliest evidence of metal in the Greater Indus Valley comes in the form of copper ornaments *ca*. 6000 BC at Mehrgarh in the Kachi Plain of Baluchistan. How this came about is still unclear, since no evi dence for processing of copper metal has been found from this site. Undisputedly, it must be based on native metal which sometimes occurs in conjunc tion with its ore. Several large seems of rich copper ores are found in Chagai area of Baluchistan, not far from Mehrgarh.

The metalcraft of the Indus Civilization is considered impressive due to the quality and variety
the earliest civilizations, such as the Mesopotamian and the Indus civilizations. It was assumed that metal tools improved agriculture, which, in turn, led to a rapid population increase and the emergence of elites who controlled copper production and trade. At the same time, the increasing demand for metallurgical artifacts was regarded as a driving force that encouraged inventiveness and technical progress among the metalsmiths. This scenario was mainly based on archaeological investigations in Mesopotamia and Egypt, where copper artifacts were found from the earliest stages of the development of complex society.

During the second half of the 20th century, however, scholars discovered many areas where the use of metal was common but they did not evolve into complex societies. At Mehrgarh, for example, metallurgy remained - for at least two millennia - a secondary activity (mainly producing occasional ornaments) without substantial cultural and social influence. Likewise in Thailand, where metallurgy focused on the production of utilitarian artifacts from the earliest stages of its development, the prehistoric society did not evolve toward a centralization of power. The second millennium Chalcolithic cultures of the Aravallis (India), the so-called Jodhpur-Ganeshwar culture, had a substantial use of copper but gained much of their livelihood from fishing, hunting, and gathering without evolving into an urban culture. Moreover, during the third millennium BC, no significant differences have been noted between metallurgical techniques used by peoples from Central Asia (e.g., the Andronovo culture) and by their neighbors living in the Greater Indus Valley but were far apart in social structure, the former being a low level of social organization while the latter a full-fledged urban society. These examples show that the use of metals and the rise of civilizations are not necessarily connected in prehistory although a limited use of metal has been a common feature for a number of early civilizations.

The question of the “origins” and spread of metallurgy has been, and probably still is, a hot topic of discussion in archaeological circles. Modern debate regarding spread of metal use in Eurasia can be traced to the work of Theodor Wertime (1), who argued that the expertise required to smelt metal was such that it could only have been discovered once, and to Collin Renfrew (2), who proposed multiple independent centers of metallurgical invention. Whilst subsequent surveys highlighted the potentially deterministic role of regional geologies, and the increased quantity of new data, they have not yet resolve the issue.

Although future scientific studies comparing the technological practices of the various regions will be necessary before the debate on the origin of metallurgy can finally be settled, opinions generally gravitate to the proposition that a single central region of invention is far more probable than independent discoveries. This core region was probably Anatolia, where copper ore and naturally occurring copper had already been exploited for several millennia (3,4). This opinion is, however, not universal. During the second half of the 20th century, scholars discovered many other areas where the autonomous development of copper metallurgy was identified. These discoveries seemed to give credence to a localization theory postulating a polyphyletic origin of metallurgy (5).

Another issue is to understand the broader processes underlying the earliest development in transmission of metallurgy, i.e. what were the motivations for the invention and innovation of metallurgy and how did these occur throughout the Old World. In this connection, Roberts et al (6) contend that metallurgy derived from the desire by the early agricultural and agropastoral communities to adorn the human body in life and death using colorful ores and naturally occurring metals. It is only in the subsequent millennia that the application of heat in a controlled reducing atmosphere led to the smelting of metallic ores to produce copper and other metals. In their opinion, the use of metals spread throughout Eurasia by the acquisition of metal objects as ‘exotica’ and often then by the movement of people possessing metallurgical expertise. However, the metal production techniques and object forms used in each early region reflect local standards, implying a process of incorporation and innovation by the communities involved rather than a straightforward or inevitable adoption (6).

It is believed that the development of metallurgy in Eurasia began long before the application of fire to metal ores. Indeed, the use of blue and green copper ores for beads, pendants and pigments was a critical step in the Neolithic, occurring at early agricultural and argo-pastoralist sites dating to the ninth millennium BC at sites such as Shanidar Cave and Zawi Chemi in north-eastern Iraq. Native copper sometimes occurs with these colorful ores and this was made use of in forming beads. This is demonstrated at sites such as Canoyu Tepes in eastern Turkey, where metallographic analyses have shown evidence of annealing ca. 8000 BC, indicating the early application of heat to the production process. Native copper exploitation flourished in this core area through the seventh millennium BC. By the late eighth millennium BC, copper metal appears outside the core area of eastern Turkey and northern Iraq, such as the native copper beads from Tell Ramad in southwestern Syria and from Ali Kosh in southwestern Iran, spreading to as far as Mehrgarh in Pakistan by 6,000 BC (7,8).

The best documented early metal-bearing ore smelting sites occur in the late sixth/early fifth millennium BC in areas far removed from the Fertile Crescent, such as Tel-i-Iblis in southeastern Iran and by the late fifth millennium BC copper production became more common in Iranian Plateau as well as in Southeast Europe. By the late fifth/early fourth millennium BC, copper ores with natural impurities of arsenic and lead were exploited throughout Southwest Asia and Southeast Iran to produce low level copper alloys with useful qualities such as increased hardness or suitability for casting. The site of Tepe Sialk, again in southern Iran, clearly shows a sequence of developing metallurgical techniques. Copper objects, dated to around 4800 BC, were produced by simple cold-hammering of native copper that was found in the metal form in nature. Subsequently, *ca*. 3300 BC, copper objects were manufactured in open molds, and a little later we find the evidence for the use of closed molds. It is after this period, probably around 3000 BC, when smelting processes, that is, extracting metal from the ore, are clearly in evidence, as well as the development of ‘lost-wax’ techniques of molding.

By the mid fourth millennium BC, copper alloys such as arsenical and antimonial copper were intentionally being produced. They were frequently selected for use over pure copper. Tin-bronze appears first in Southwest Asia by the end of fourth millennium BC. It is probably from this general area from where the art of smelting copper appears to have spread eastward to the Baluchi hills and Central Asia. The Kerman region of Iran - situated between the better-known cultures of the west and those of Baluchi hills to the east - seems to have played a crucial role in the dissemination of technologies from Mesopotamia and western Iran to the east and the northeast As with almost all other innovations in early metallurgy, the adoption of tinbronze was not immediate, but happened over centuries as cultural values changed and people learned to incorporate the new material into their socio-economic and socio-cultural systems.

In studying the historical developments in metallurgy in ancient Pakistan, one has to contend with several issues. The first and the foremost is, of course, that of origin and diffusion: did the extraction of metal (smelting) from its ore developed locally within the confines of the Greater Indus Valley and its immediate neighborhood, or was this knowledge acquired from some core technological area outside the Greater Indus Valley? The second issue is to understand fully the nature of the metallurgical knowledge possessed by different pre-historic cultural groups within the Greater Indus Valley and in the neighborhood. Did they belong to the same metallurgical tradition or can one detect different traditions among them? In the same context, what were the different ore-sources that the Indus people exploited. Did all the cultural contexts in which copper-bronze objects have been found smelted their own metal or was the metal imported from a source outside the Indus realm? To what extent the Harappan smelting technology be related to the preHarappan technologies and to those contemporarily prevailing in the neighboring lands? The answers to these questions are not satisfactory in the present stage of knowledge.

While the ’core areas’ of the early developments in metallurgy are more-or-less in sight, the extensive overlapping exchange networks that connected the greater Indus region to these areas make it difficult to determine the role of diffusion in the origins and dispersal of various metal technologies, especially copper metallurgy. Nonetheless, the pervasive model is that copper-working technology was developed somewhere in West Asia and diffused to adjacent regions such as the greater Indus region (9). It is based on assumptions regarding human cultural interaction and the control of knowledge that are not supported by the archaeological data currently available for study (10).

Contrary to such a model are the theories that effectively attempt to prove that metallurgy, specially that of copper and its alloys, developed independently in South Asia. For example, H.C.Bhardwaj (11) states that the pattern of Harappan alloying was different from that of the contemporary Egypt and Mesopotamia. He argues that because the Harappan copper-bronze technology differed from the technology of the West and possessed distinctive features of its own, it could have had an independent growth, though “possibly sharing a common base with west Asiatic metallurgy”. This is, however, a non-argument as the technology could have a common base with the west or it could have an independent growth, not both. Furthermore, it is not clear what Bhardwaj precisely means when he points to the differences in technology. If it primarily reflects on the differences in the composition of copper alloys, these differences could easily be explained away on the basis of the differences in the composition of the ores available in the respective areas in the early stages of metallurgical developments. A few other scholars have also strived to prove an independent origin of copper metallurgy in Pakistan and India on similar grounds but most of these arguments are conjectural at

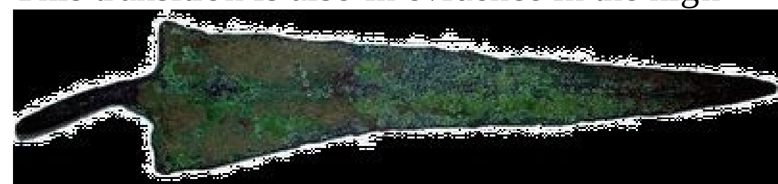
best. Archaeological evidence is scanty and it poses the usual set of problems which generally beset the archaeology of ancient lands.

The issue of the “origins” of metallurgy in South Asia has lately become muddied and rather emotional. On one hand, there is a strong tendency of the Near Eastern archaeologists to drag every evidence to the West, possibly to Mesopotamia; if not, then at least to western Iran and Elam. On the other hand, there are some Indian archaeologists who espouse the ‘India first’ theory whether the evidence points to such a conclusion or not. The result is a grossly biased presentation of the subject.

Throughout West and South Asia, beginning in the Paleolithic and continuing through the Neolithic, we find evidence for a familiarity with fire and its effect on various materials. In the Upper Paleolithic, iron ores were routinely roasted to make pigments and chert was heated to make it more flakable. During the Neolithic and early Chalcolithic, pyrotechnologies included the firing of different types of clays to make ceramics, and the heating of lithic materials to enhance color, workability, and/or hardness. Although we have no direct evidence for the earliest metal procurement techniques, it is not unlikely that fire was being used to extract native copper lumps and granules that could then be further processed by hammering and annealing. These developments were probably happening in several regions; for some we have archaeological evidence but for others we may not. In the absence of a proven center of origin and a clear route of diffusion, we may safely assume that the development of metallurgical knowledge in Eurasia was a cumulative experience of the pre-urban communities of Iran, Afghanistan, and Baluchistan in which West Asia also played a pivotal role.

The many different pyrotechnologies in practice make it unreasonable to assume that the discovery of metal smelting and melting was simply an accident, and not the result of intentional experimentation and innovation. For the greater Indus region, the evidence from Mehrgarh and other early sites demonstrates that the pyrotechnological and metallurgical innovations of the Neolithic and Chalcolithic set the technological background for the metallurgical traditions of the Harappan Phase (7). It is clear that the origin and development of copper metal technology occurred in conjunction with developments in other technologies. At the site of Mehrgarh during the fifth to fourth millennium B.C., changes were occurring simultaneously in metal production, ceramic production, the drilling of hard stone, production of fired and glazed steatite beads, and shell working. A decrease in the use of certain types of bone and stone tools is also seen at this time. The transitions seen at Mehrgarh between the Neolithic and the Chalcolithic have numerous parallels with similar changes in other regions, especially in southern Afghanistan and eastern Iran.

This transition is also in evidence in the high

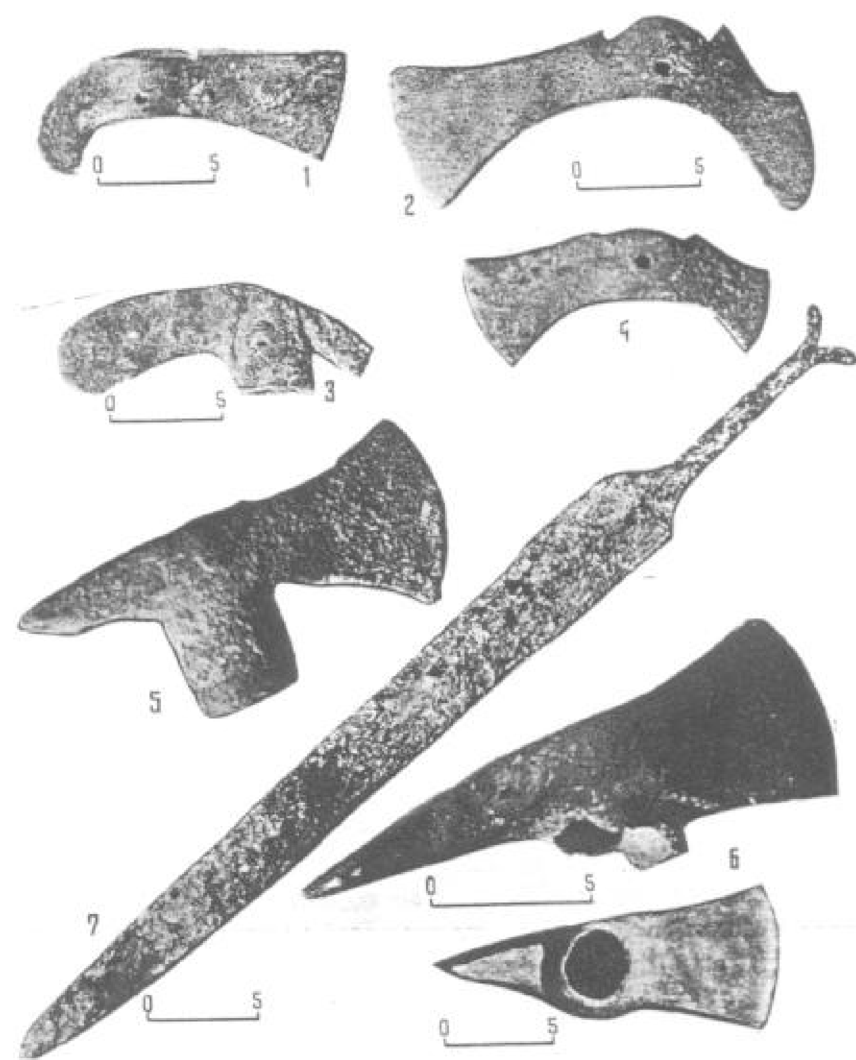

A Sumerian copper dagger (c. 2500 BC)

lands of Baluchistan and other regions of the Greater Indus region. Sites such as Nausharo, Balakot, Ghazi Shah, and Rehman Dheri, all show evidence for the use of copper in the period prior to the Early Harappan Phase, along with changes in other technologies. Throughout southern and northern Baluchistan and southeastern Afghanistan the combined resources of metal ores and fuel were available to communities of sedentary agriculturalists and semi-nomadic pastoralists, which were developing in this general area during the Early Harappan period. Through an extensive network with

each other and with other regions to their west, such communities, were undoubtedly familiar with the properties of ores and how to extract the metal long before it became an important economic process (7,12).

Since there are many regions of West and Central Asia that are rich in both metal ores and fuel, it is quite likely that regional styles of pyrotechnologies evolved according to the physical characteristics of locally available ores. Over time, the regional styles that were less effective and/or practiced by sociopolitically weaker communities would have been eliminated or absorbed through competition. More widely separated regions such as Rajasthan (India), which are separated from the west by the Indus Valley flood plains, may have retained their styles and continued to function parallel to each other for a longer period of time. Future studies of regional styles of metal processing and use may provide valuable information for understanding the development of a possible Indus "technological style" or multiple "technological styles" (7).

The Indus metal artifacts on which appropriate analyses have been carried out are highly limited in number and not representative of all the contexts in which the artifacts have been found. But whatever little has been done has ensured a considerable difference in knowledge between 1950 when D.H. Gordon published his paper on "*The Early Use of Metals in India and Pakistan* (13) and today when the result of some valuable research have become available. Gordon's paper deals with the beginning of both copper and iron and it is significant only in the sense that this possibly is the first paper on the subject to base itself solely on the archaeological data. Gordon postulated an early link of the Indus Valley with Iran. He also postulated three phases of the arrival of copper-bronze technology in the subcontinent: the Amri culture of the Indus plain having ties with Iran, the builders of the Harappan Civilization who, according to him, came from Mesopotomia, and the post-Harapopan 'Aryans" who brought in the copper hoards. Apart from the suggestion of an early link with Iran where the beginning of this technology is considerably earlier, none of Gordon's ideas is acceptable at present.



Copper and bronze implements from south Turkmenistan and northern Iran, ca. 2000 BC

There was a considerable increase in data by 1967 when Lamberg-Karlovsky published his review of archaeology and metallurgical technology in prehistoric Afghanistan, India and Pakistan (14). Assuming an early connection with Iran, he reviewed the pre-Harappan materials from Afghanistan and Baluchistan and suggested them to be parts of the same growth process that prevailed in the region. Although relative chronology is not clear, based on archaeological evidence available so far the smelting techniques evident at Sialk and Tel-e-Iblis (the Iranian Plateau) seem to be earlier than their documented appearance in Baluchistan, Sindh, or anywhere else in Pakistan and India. Smelting of copper ores is in evidence in southeastern Iran by mid fifth/early fourth millennium BC while the collective evidence in the Greater Indus Valley suggests that copper smelting here probably started in the late Early Harappan period, ca. 3,500 BC. Thus, it is logical to conclude that the knowledge of copper smelting came to the Greater Indus Valley from Iran. As far as the peninsular India is concerned, it was after the flowering and eventual wilting of the Harappan Civilization that metals were introduced to the Gangetic plains in any meaningful way. There are some claims that south India already knew copper before this technology was introduced to the northern plains. There might be some truth in these claims but no one has been able to make a clear case yet. In any case, all these references are to the timeframe of late second millennium BC. and not relevant to the Harappan Civilization.

The earliest evidence of copper in ancient Pakistan is a cylindrical bead from Mehrgarh that was most probably made of native copper. The date of this bead cannot be later than 6000 BC. During the next period the use of copper was restricted but from period III of Mehrgarh that begins in the early fourth

millennium BC, there is evidence of terracotta crucibles with metal deposits sticking to them (15), indicating the melting, refining, and probably even smelting of copper. From the middle of the fourth millennium BC the use of copper increased and the evidence is reasonably extensive: adze, saw, axe, chisel, dagger, seal and bead at Nal, which is of alloyed copper. The Early Harappan levels at other sites also yielded a number of copper objects but these findings are not as extensive as generally believed.

Copper-bronzeobjectsarefoundat Mehrgarh also *ca.* 4,500 BC. but it is not known if this copper was of natural origin, i.e. if it was the result of a chance finding of native-copper nuggets. A copper pin from Pirak in the Kolwa Valley, a single loop copper pin from Kulli, a decorated copper bracelet from Nundara and worked copper fragments from Zayak in Kharan, Siah Damb and Mughal Ghundai in the Zhob give us but little material upon which to form any opinion except that copper was used by these early peasants communities whose painted pottery is closely linked with that of early Iran. The more extensive copper finds of Mehi
- a bracelet, mirrors, pins, bangles and a bowl - might date any time between 2600 and 2000 BC but not earlier.

The many parallels between the Kulli culture and the Harappa culture of the Indus have been clearly indicated by Piggott. Nal, which bears much the same relationship in date to the Early Indus as does early Kulli, has copper flat axes and knives, and the position of pottery related to this culture found in the Indus Valley, is contemporary with the overlap of late Amri and early Harappa. Majumdar's more systematic trial excavations in Sind indicated very little copper in use by the peasantry communities of the Amri and allied cultures of the Early Indus period. A copper chisel was found at OthmanjoButhi in association with pottery that is Early Harappan. A fragment of a chisel found at Arabjo Thana is also associated with early pottery and is probably equally old, i.e. the Early Harappan period, ca. 3,500 BC.

The most extensive published collections of metal objects are those from the early excavations at the Mature Harappan sites of Mohenjo-daro, Harappa, and Chanhu-daro. The metals from excavations at Lothal provide information on the metals of Late Harappan Phase in Gujarat. Information on metal use in the greater Indus region prior to the Harappan Phase comes primarily from the site of Mehrgarh. The rest of the copper objects found at Jhukar, Chanhu-daro, Lohumjo-daro, Lohri, Jhangar, Gazi Shah, Ali Murad, Dhal and Shahjo-kotitro are of Harappa date or later. The main sites of Harappa, Mohenjo-daro and Chanhu-daro, which have been extensively excavated, have produced a considerable diversity of objects made in copper or bronze, and it is obvious that this largely urban people with outlying agricultural settlements had a considerable degree of metallic knowledge. The stratigraphic studies are, however, rare, and it is not always possible to trace the development of metallurgical technology at these sites.

For the Mature Harappan Phase, the best references are the catalogues of metal objects compiled by Yule (21), providing descriptions and illustrations of the copper objects from Mohenjodaro, Harappa, Lothal, and several other sites, including many objects previously unpublished. Herman (22) has also compiled a catalogue of metal objects from the published Harappan Phase sites, which is particularly useful for its assessment of the stratigraphic relationships of the objects. In 1995 Haquet of the University of Paris prepared a data base and typology of metal objects from Mehrgarh, Nausharo, and Mundigak (23). An exhaustive review of Harappan metallurgy comes from Kenoyer and Miller (7) which essentially forms the basis of this chapter. Some work has been done in India but these

investigations generally pertains to the Late and post Harappan periods.

Reviewing the evidence, we are at loss as to the chronological development of copper metallurgy in the Indus Valley. Nor does it give us any clear distribution pattern or the mode of spacial expansion of copper. All what we can say is that: 1) copper was known to the Indus people almost

from the Neolithic period, ca. seventh millennium BC;

2) small-scale (crucible) smelting of local ores was probably practiced by 3,500 BC in Baluchistan;
3) the use of copper and bronze was not extensive in the early parts of the Harappan Civilization or its antecedent cultures, at least not as extensive as in contemporary Mesopotamia and Egypt; and
4) the Harappan technological skills were as high as anywhere else in the contemporary Old World.

Metal Processing Technology - Smelting and Melting: The major indicators for metal processing at a site include: (i) fragments of ores; (ii) kilns, or fragments of kilns, attributed to metal processing; (iii) metallurgical slag, from the reduction of ore to metal; (iv) tools used for metal processing, such as crucible fragments with metal prills, molds, anvils, stakes, hammers, chisels, etc.; and (v) metal objects, including smelting and melting ingots, semifinished and finished objects (7). Significant amounts of ores and/or metallurgical slag fragments are the most convincing evidence for smelting at a site. A variety of clay-based non-metallurgical slags, including fragments of kilns and crucibles, can represent either the smelting of ores or the melting of metal, depending on the exact nature of these indicators. Metalworking tools (other than crucibles with prills or molds) are usually difficult to attribute directly to metal processing, except when found in well-documented contexts in association with a number of other metalworking indicators. Metal objects, including metal ingots, must also be from such contexts to show their production at a site, as these objects may have been imported from other sites.

Copper Smelting: Besides occasional finds of ‘native’ copper in antiquity, the age of copper and bronzes begins with the development of ‘smelting’ technology, which is essentially an art of extracting metal from its ore. Smelting uses heat and a chemical reducing agent to change the oxidation state of the ore; the reducing agent is commonly a source of carbon such as coke, or in earlier times charcoal. As most ores are impure, it is often necessary to use flux, such as limestone, to remove the accompanying rock gangue as slag.

It is true that ‘native’ copper is sometimes found in some copper rich ores but it is rarely in the form of nuggets; the ‘native’ metal is oftentimes dispersed within the crevices of the rock and it must be ‘extracted’ through the application of heat to the pulverized ore. In simple terms, the raw metal is ‘melted out’ of the rock. Thus, some rudimentary process of melting of native copper, even in conjunction with the process of baking of pottery, must have involved. In fact, melting of native copper in crucibles for its purification and casting was known before smelting of ore in southeastern Iran.

It seems that the art of smelting was discovered in the context of extraction of native copper from its mineral gangue by melting (25). An analysis of information from the Anarak region (in the Iranian Plateau) suggests a sequence for the development of crucible smelting. In this area, malachite (a copper ore) was mined from the 8th millennium BC as a semiprecious stone and/or pigment, and native copper was worked from the 7th millennium BC, first by cold hammering, a technique later replaced by heat hammering and annealing. From the early 5th millennium BC, copper (probably of

native origin) was melted and then cast in open molds (24). At Tepe Qabristan, in addition to casting molds, crushed malachite has been found near heavily slagged crucibles, confirming that copper ore was indeed smelted. The same temporal sequence of events (cold and heat hammering, annealing, and casting of native copper) preceded the emergence of crucible smelting of copper in the northern Euphrates area, and probably in the Kachi plains and southern Baluchistan.

No evidence for the smelting or melting of copper has been found during the Neolithic period in the greater Indus region. The initial stages of copper processing (extraction of native copper or smelting) were probably being carried out closer to the source areas in Baluchistan and Afghanistan. The question of how this technology evolved is still unclear and will not be fully understood until new surveys and excavations are carried out. Nevertheless, by the fourth and third millennia indications are that mining and smelting of ores was being carried out in many localities in Baluchistan and Afghanistan. Such a reading is, however, not conclusive; the indications may simply represent melting of the metal rather than smelting (extraction of the metal from the ore). The smelting of copper ore has been noted in many areas of Asia and Europe between the fifth and the second millennium BC (5).

The paucity of metal ores from Indus sites was noted above; there is a similar lack of metallurgical slags. Smelting of metal ore usually results in fairly conspicuous accumulations of manufacturing debris and broken furnaces. In particular, the smelting of most ores results in the production of weather-resistant metallurgical slags, vitrified masses of silica, and other fused minerals, which generally accumulate in conspicuous mounds near the smelting furnaces. On the basis of quantity and type of slag, the small amounts of copper metal slag found at early Indus sites seem to be more representative of melting rather than smelting (26).

This lead to the conclusion that the Hardpans acquired their metal from other sites; from sites closer to the source of ore within the Greater Indus Valley or from sites far removed,such as the coastal regions of Oman. Kenoyer and Miller, who have done quite extensive research in this area, subscribe to this scenario: “In view of the present evidence, we must concur with Sana Ullah's and Mackay's earlier interpretations that most of the copper used at the Harappan sites was imported in ingot form, and little or no smelting was done at the major sites of the Indus Valley” (7). Plano-convex disc-shaped ingots (almost all of copper) have been recovered from Chanhu-daro, Lothal, Harappa, and Mohenjo-daro. The shape of these ingots reveals the fact that they were produced in open pit furnaces or large crucibles. Many of the ingots recently rediscovered in the reserve collection at Harappa and Mohenjo-daro have been found smashed and broken in half or smaller wedge-shaped fragments, apparently to facilitate further processing. This strengthens the above-quoted proposition of Kenoyer and Miller. The jury is, however, still out on this point.

The practice of smelting by the Harappans for the acquisition of metal cannot, however, simply be thrown out of hand. The smelting of lead was practicved in the Jhalawan area of Baluchistan during the Amri-Nal phase, around 3500 BC, and it is possible that during this time the Indus artisans could have discovered the art of copper smelting as well. This is evident by the increasing frequency of findings of copper artifacts at Mehrgarh and in southern Baluchistan.The absence of slag heaps and smelting debris at Harappan sites may be due to the fact that most excavated sites, particularly of the Mature Harappan Phase, are located some distance from the primary sources of metal ores.

Another explanation for the absence of large quantities of slag is on the mode of production and the

smelting technology employed. Several examples exist in antiquity. The earliest is the use of crucible for smelting as well as melting. This produces small batches of smelted copper, generating equally small amounts of slag. Crucible smelting was eventually replaced by pit smelting or the use of high temperature furnaces. Crucible smelting was the earliest mode of copper production. It always remained a very limited activity, generally coexisting with the use of native copper extraction. Beyond the limited yield, the reduced volume of the crucible prevented the addition of fluxes, so that successful smelting always depended on the supply of highgrade oxide and sulphide ores. Under these conditions, crucible metallurgy would cease to exist as soon as the availability of high grade ore diminished. This explains the limited use of copper in the Harappan Civilization and in the Early Indus cultures of Baluchistan. It also explains the absence of large amounts of slag in or around the Harappan sites.

This explanation goes against the discovery of raw copper ingots in Mohenjo-daro, Harappa, Chanhu-daro, and Lothal, which are fairly large in size and cannot be produced through crucible smelting. It indicates the use of large crucibles or pit furnaces. While large crucibles have been discovered elsewhere (such as in Thailand) the archaeological evidence does not indicate the use of large bowls in the Greater Indus Valley and India till late in prehistory. In Thailand and on the Iberian peninsula, the replacement of crucibles by furnaces occurred about 1,500 years after the discovery of crucible smelting, it took almost 3000 years in Pakistan and India, and it never occurred in pre-Columbian metallurgy, despite the high degree of technical achievement of the metal artifacts produced and the extensive knowledge of Amerindian smiths in metal alloying.

The earliest production of copper in the Indus Valley is often argued to have been carried out using very pure oxidic ores such as malachite and azurite that were directly reduced through the addition of charcoal, which would have provided a source of carbon monoxide. However, achieving the conditions necessary to completely reduce pure oxidic ores requires air-tight ceramic containers that can also withstand the high temperatures needed to melt the resulting product (1086 degree centigrade). Such highly-specialized ceramics had not yet been discovered at the beginnings of metallurgy in most regions, and there is certainly no evidence in early periods for the construction of elaborately sealed smelting structures anywhere.

Pit furnaces or pit kilns occur in quite a large number near the main sites of Harappan Civilization, the latest known being at Balakot in Las Bela District and those surveyed in the Hakra Valley in the Cholistan desert of Bahawalpur. A shallow pit was dug and lined with clay. Charcoal could be placed in it and then the copper ore. The whole mass was then covered with wood. As fire blazed, it was vigorously fanned in a manner as the metalsmiths in Pakistan do to this day. The molten copper will sink in the bottom, covered with glassy slag. After cooling off, the slag could be broken off and the copper ingot recovered. This is, however, merely a conjecture. The pit furnace discovered in the Harappan sites may as well be the kilns for firing pottery and bricks. A second type of kiln, a double decker, updraft type kiln, described in the preceding chapter, has also been found but it is not clear if these were used only for pottery firing or if they were also being used for copper smelting. Dales and Kenoyer (30) have recovered a few kiln wall fragments with embedded copper prills, on the southern slope of Mound E at Harappa, while Vidale also reports the discovery of small circular kiln (approximately 0.8 to 1 m in diameter).

Four kilns at Harappan sites have been attributed to copper-processing: one at Harappa, one at Lothal, and two at Mohenjo-daro. In all these kilns the interior is heavily vitrified, and the blackened melted

surface indicates a reducing atmosphere. This evidence of high temperatures seems to have been the primary reason for attributing these kilns to metal processing. However, evidence of high heat alone is not sufficient to show that a kiln was used for metal processing. Many of the excavated Indus Valley Tradition pottery kilns show similar vitrification (30).

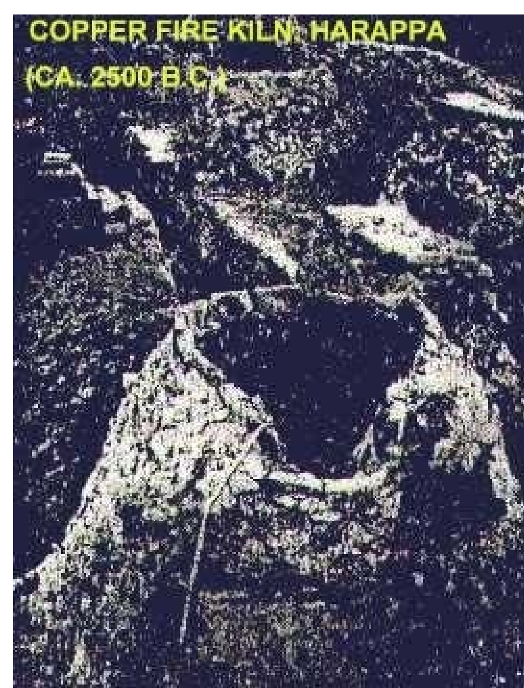
If the crucible smelting was in fact replaced by kiln smelting, as the size of the copper ingots in major Indus sites indicates, the process must produce large quantities of slag which is conspicuously absent in the Harappan sites. An explanation of sort has been offered for this dilemma as well:

Charcoal is not the single potential source of reducing agent for smelting. Copper sulfide (such as chalcocite or bornite) may be used too. Under high temperatures (*ca.* 1200°C), the sulfur-rich atmosphere generated by the supply of about 20% of sulfide ore is able to extract the smelt of copper from oxide ore, a process called *cosmelting*. Even in an oxidizing environment (open crucible), the combination of oxidic and suphidic ores will lead to the production of copper whereby the sulfur removes the oxygen from the ore at sufficiently high temperatures. The use of oxidic ore mixed with sulphidic enabled one to fill most of the crucible with copper ore instead of topping it off with charcoal, thereby improving the yield. Harappan world was rich in copper oxide ores as well as sulphide ores and the metalsmiths may have advertantly or inadvertently may have practiced the art of cosmelting. Through increasing the efficiency of smelting manyfold, the Hardpans would be able to produce suffi

southward

cient amounts of copper per crucible (or in open kilns) without producing inordinate volume of slag.

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bottom,

A copper smelting furnace at Harappa,
A copper smelting furnace at Harappa, ca. 2500 BC c. 2500 BC (after Kenoyer)

Page 379 This hypothesis gets support from the fact that copper produced in the Harappan realm frequently included arsenic, an element generally present in sulfide but not in oxide ores. A preferential mining of copper ore rich in arsenic is observed in the Iranian plateau (region of Anarak, Seistan, and Veshnoveh) during the phase of crucible metallurgy (24). This might as well be the case with the Hardpans working in Chaghai area of Baluchistan where both oxide and sulfide ores are found.

Where does this all lead us to? While there is a distinct possibility that the Harappans smelted their copper in-house, that is, at the Harappan sites, and while some archaeologists, such as Agrawal and Chakrabarti do advocate such a scenario, Hoffman, Kenoyer, and Miller are not convinced. They place the smelting of copper ore away from major Harappan sites and engage the Harppans in the remelting, purifying, and alloying the 'imported"'raw copper. The raw copper, however, could have been 'imported' from the source area within the Greater Indus Valley or from anywhere else. Rao, on the other hand, designates Oman as the source of copper ingot that the Gujarati Harappans imported for further finishing and fabrication.

Melting of Metal: Melting of metal is a necessary stage in the production of cast objects, both semi-finished and finished. The remelting of original smelting ingots to produce secondary or refined ingots is also a common intermediary stage between the production of the original smelting ingot and the final fabricated or cast object. This secondary ingot production is undertaken for one or more reasons: to remove slaggy impurities left in the original smelting ingots; to break up large smelting ingots into more workable or transportable ingots; to form metal alloys; and/or to melt down metal scrap, which is usually varied in composition. Sana Ullah remarked in the very first published analysis of Harappan Phase ingots (his "copper lumps"), that three of the four ingots were the "crude product of the smelting furnace" which were too rich in sulfur to be forged. He suggested that such ingots would be remelted for refining; otherwise this metal could only be used for casting "heavy or plain objects."

As noted above, much of the archaeological evidence for melting (and casting) resembles the evidence for smelting, i.e., the presence of crucibles, kilns, slag, and metal ingots. However, careful analysis of these objects, particularly identification of the types of slags present, usually allows differentiation of these processes.

Evidence for melting of copper in crucibles is first found up to Period III at Mehrgarh, dated to 4000-3500 B.C. Crucibles with traces of melted copper have been found in rubble associated with a Period III firing structure made of brick. Only a few crucible fragments with copper prills have been reported from other Mature Harappan sites, and although they could represent small-scale smelting of high-quality copper, copper melting seems more likely (7). A crucible rim fragment was found during excavations at Mohenjo-daro, and it was concluded then that it represents the re-melting of crude metal for refining. No analyses were ever published, but the photograph of this rim shows slagging, and looks quite similar to fragments found by the Aachen/IsMEO surveys at Mohenjo-daro. A single crucible is also reported from the excavations at Harappa; Vats mentions in a footnote that "a fragmentary earthenware crucible whose contents show that it was used for melting bronze" was found near furnace "Fa" on Mound F at Harappa. Again, no analyses were ever published. Finally, the

so-called "crucibles" reported from Lothal must be some other kind of containers, as they had no traces of slagging and upon analysis contained no trace of copper (27).

The evidence from surface surveys and the HARP excavations at Harappa and Mohenjo-daro is much more encouraging. At Harappa, half a dozen crucible rim fragments with slagging and copper prills have been found in surface surveys of the southern slope of E Mound, and a number of both rim and base fragments of similarly slagged crucibles have been found in nearby excavations (28). At least two crucible fragments with slagging and copper prills were also found in surface surveys at Mohenjo-daro, as well as an entire small ceramic cup (29). This cup is similar to the crucibles used by modern goldsmiths in South Asia, but there are no visible traces of metal or slagging, and microprobe analyses found no traces of any metal (7).

Metal Processing Technology - Casting and Fabrication: The production of metal objects can be divided into two categories, casting and fabrication, depending on the state of the metal during the actual working. Casting is done when the metal is molten and fabrication is undertaken when the metal is not molten. These two categories divide the methodologies of metalworking artisans as well as the states of the metal itself. Fabrication involves the direct shaping of metal, while casting begins with the shaping of other materials into which the molten metal is poured.

The tools and techniques of the two categories overlap to some degree, and ancient metalworking ateliers may have been involved in both fabrication and casting. Some objects, however, may have been cast by one group of artisans and finished or fabricated by another group in a separate workshop. The possible division of manufacturing stages into discrete and often exclusive activities practiced by different artisans is an important part of metalworking that has not been investigated for the Indus Valley Tradition primarily because metal production areas have not yet been conclusively identified.

Casting: By defining casting as the shaping of molten metal we include a wide range of metalworking activities, including the production of secondary ingots as well as the casting of semi-finished or finished objects. Evidence for casting thus includes all of the indicators discussed above in the section on Melting, as well as several types of indicators directly related to casting, such as molds, semifinished objects, and finished objects.

The best evidence for casting activities at a site is the presence of molds. Ancient mold types include open stone, terra-cotta, or sand molds; bivalve stone, terra-cotta, or sand molds; and terracotta-based "lost wax" molds. At present, no convincing examples of any type of mold for casting metal have been reported from Harappan sites.

The only published stone "molds" from a Harappan site are from Lothal, where Rao identifies two grooved stones as open molds for casting pins/ rods. The first problem with Rao's identification is that the grooves are much larger than the metal pins found at Harappan Phase sites. Second, the grooves are not straight along their length or sides and taper off in depth at each end, which seems highly impractical and unlike known casting molds from other regions and periods. Third, there is no report of discoloring or spalling, which would occur if molten metal were repeatedly poured onto a stone surface. Similar stones (made of sandstone and quartzite) with long parallel grooves have been found at Harappa and Mohenjo-daro, and at Chanhu-daro, they are clearly associated with agate bead manufacturing areas. The grooved stones from Lothal probably do not represent open stone molds for metal casting (7).

The presence of cast objects and no molds could be taken as an indicator of importation of finished metal objects, but this seems unlikely. Many of the cast Harappan Phase metal objects, particularly the figurines, are definitely Harappan in style, corresponding to the morphology and subject matter of objects in other materials such as faience, stone, and ceramic. There is no evidence for Harappan-style metal objects or molds from sites outside of the greater Indus region; indeed, Yule (21) notes that Harappan Phase metalware is very different in style from contemporaneous products in other regions. It is more likely that this paradox is due to the lack of identified metal processing areas at Harappan sites and also perhaps a problem of the archaeological identification of molds. The Egyptians and Mesopotamians obligingly left molds of stone, clay, and even metal; the Indus peoples were not so helpful. Given the scarcity of stone in the Indus Valley flood plains, it is possible that stone molds were reused for other purposes. However, this seems extremely unlikely, as the detailed examination of every fragment of stone and fired ceramic recovered from five seasons of excavations at Harappa, as well as examination of the Mohenjodaro reserve collections, has not revealed any fragments of stone or ceramic molds. Another explanation is that the Indus peoples used mold materials, such as sand or sandy clays, that leave little trace in the archaeological record.

Both the sand and lost wax casting leave almost no archaeological traces. Sand-based molds are used for casting in modern South Asia and many other areas of the world, and employ a finely powdered sand, sometimes mixed with water and organics such as dissolved sugar. This mixture can be used to make an open mold or packed into a hinged wooden box to make a bivalve mold. A form made of wood or some other material is impressed into the sand mixture, which is cohesive enough to create a mold into which the molten metal is poured. It is well suited for flat objects, such as celts, axes, adzes, knives, or spears. It may even leave characteristic bivalve lines on the objects, often taken to be indicative of the use of stone or terra-cotta bivalve molds.

Since forms are used to impress the sand and create the mold, some degree of duplication of objects is possible, and creation of the sand molds is obviously quite rapid. Although these molds have a great resistance to heat, making them an excellent casting material, they break down quickly into sandy deposits when exposed to weathering from water and wind. In addition, modern sand molds are usually ground and reused, and ancient molds would probably have been similarly recycled.

The materials used to make lost wax molds are also quite ephemeral. These materials form a continuum with the fine sticky sand used for sand casting, but employ a more cohesive sandy clay so as to better retain the complex three-dimensional features of the object to be cast. Lost wax casting often employs several grades of material. First, the model of wax, resin, tar,etc., is coated with a fine sandy clay. This inner coat will form the details of the object to be cast, so the finer the detail desired, the finer the texture of the coat. Increasingly coarser sandy clay is used to form the bulk of the mold. The crucible containing the metal can be built into the mold, as is done in the present-day India and Pakistan, or metal can be poured into the mold from a separate crucible, as was done in the Americas and Egypt.

An essential component of the lost wax process is the use of a sandy clay that will not sinter under high temperatures. Thus, in addition to the fact that the molds are broken to remove the cast object, such molds also break down very quickly when exposed to weathering. As with sand casting, the broken pieces of the mold are also often recycled, increasing their archaeological invisibility.

Not very many molded bronze objects have been found in the excavated Indus sites but whatever is

available shows that the Harappans felt quite at ease in casting the molten bronze. Clay molds were probably used to cast whole or parts of copper and bronze artifacts. There is little doubt that such special objects as the cast bronze figures of people and animals, or the little model carts, of which nearly identical examples come from sites as far apart as Harappa and Chanhu-daro, were the products of specialists' workshops in one or other of the cities. These products of the casting of copper and bronze illustrate that the process was well understood throughout the Harappan period.

Apart from using simple casting molds, well ventilated complex moulds were also employed with great skill, particularly in making bronze figurines of humans and animals. Whether the Harappans knew the technique of 'lost-wax' casting, as is generally claimed, is not certain. If the technique was indeed known, it is difficult at this stage of research to assign its development or introduction to a particular period. The bronze figurines from Mohenjo-daro are certainly not from the latest mature Harappan period. Axes cast in closed molds are found at an equally indeterminate, but not late, date.

The lost-wax process is an elaborate one. To cast a small solid statue, such as the Dancing Girl, it was first modeled in wax. The wax model was then covered with a layer of fine clay and enveloped in a thick coating of coarse clay. The assembly was first allowed to dry and then hearted so that the wax could melt and run out. Molten metal could then be poured into the hollow of the hard mold thus prepared. This inner coat will form the details of the mold. Or, the crucible containing the metal can be built into the mould, as is also done in Africa. An essential component of the lost model process is the use of a sandy clay that will not sinter under high temperature. The mold would then be broken open to get the object out. The Harappan tradition of bronze casting, so well begun, did not continue for long. The art of producing bronze sculptures emerged again only during the Kushan period.

The bronze Dancing Girl from Mohenjo-daro is perhaps the most outstanding object displayed in the galleries of the Indian National Museum in New Delhi. Made in *ca*. 2500 BC, it is an image of a naked young girl in a dancing pose. Though it is only 11 cm., it tells us a lot about the level of metal technology in the Harappan Civilization. It is the first bronze sculpture discovered in South Asia. Its most interesting aspect is that in casting it the Harappan metalsmniths used the lost-wax (*cire perdue*) process, which is universally considered an advanced technique of metal casting.

Fabrication Technologies: A clearly observable developmental sequence of metal fabricating technology, stratigraphicaly defined, does not exist in the excavations of the Harappan sites. Whatever can be deduced in this connection shows that there was not any great development in metallurgical skills from the inception of this civilization to its decline. From the earliest excavated levels, techniques are evident that are also characteristic of the later Mature Harappan. The Harappan metallurgy, therefore, cannot be studied in context with time. On the other hand, the scope of Harappan metallurgy and metallurgical skills is expansive and is truly impressive in terms of space. A great diversity of copper and bronze objects has been found in all Harappan sites. These include Mohenjo-daro, Chanhu-daro and Allahdino in the south; Harappa and Kalibangan to the north; Lothal, Surkotada, and Gola Dharo to the southeast; and several other sites in between. These objects represent a vast array of fabrication techniques spread over a long period of time from the beginning of urbanization to the end of the Harappan Civilization.

The Harappan used copper and its alloys to make weapons and tools as well as utensils and ornaments. Nearly all the basic tool-types - flat axes, chisels, knives, spearheads and arrowheads, small saws, etc - would have been made by simple casting, and/or chiseling and hammering. The flat

axes, usually stocky and of sub-rectangular form with splayed edges, and the mirrors were cast in open molds. The chisels and thick-blade knives were hammered from square– or round-sectioned rods. All of the objects of thin sections, i.e., knives, arrows, spearheads, razors, and saws, were chiseled from sheets of thin roll hammered copper. The techniques of raising, hollowing, sinking, riveting, lapping, and soldering are also known to have been practiced, as is evidenced from the artifacts recovered from the core Harappan sites. The main tool types at Harappa are: razors; chisels, knives, barbed arrow-heads, spear-heads, celts, hooks, saws, tubular drills and mid-rib swords. It is to be noted that the first true saw appears in Harappan times, which does not recur again till the Roman period. Copper and bronze vessels which are among the outstanding examples of the Harappan metal crafts were manufactured by hammering into a given shape. In the Late Harappan period an additional technique, that of lapping or joining two parts to make a composite jar, appears.
heads, saws, etc. These could have been chiseled out from sheets of copper. By cold hammering, the hardness of an artifact can be considerably increased. This technique was used by the Harappans, as is indicated by metallographic analyses of the Harappan objects. But too much of cold hammering makes an object brittle.To make the metal malleable and ductile again, it has to be re-heated (annealed). The Harappans made use of this property as indicated by the polygonal grains and twinning in the metallographic sections of the artifacts. Today, most commercial annealing is done at 590°C
- this does not allow any undue grain growth but makes the metal soft. Copper can be worked at high temperatures - up to 1050°C. But such hot work does not increase the metal's hardness, ductility or strength. Of course, it does increase the density of the metal by closing up gas holes and pores,

and refines the coarse grains.
the slag could be broken off and the copper ingot recovered. A somewhat advanced
Sheet manufacturing is also a form of forging
technique was the use of crucible. The ore, along with some charcoal was put in a
and fragments of copper, silver and/or gold sheets crucible, which in turn was imbedded in a pile of burning charcoal. This method would
have been found at Chanhu-daro, Harapa, Lothal,
yield somewhat clear metal. A third type of kiln, a double decker, updraft type kiln,
and Mohenjo-daro. However, the method of sheet
described in the preceding chapter, has also been found but it is not clear if it was used
manufacture is unknown, and there are no pub
only for pottery firing or if it was also being used for copper smelting. Opinions differ lished anvils or hammers. Sinking and raising to
form vessels from metal is also a form of forging. As
but this type of kiln could not have generated the desired temperature that was needed for copper smelting.
the name implies, sinking is the forming of metal by hammering from the interior of the object into a de
pression on an anvil, while raising employs ham
Fabrication Technologies: A clearly observable developmental sequence of metal
mering from the exterior of the object over a shaped
fabricating technology, stratigraphicaly defined, does not exist in the excavations of the
stake. The Harappans seem to have raised the
Indus sites. Whatever can be deduced in this connection shows that there was not any

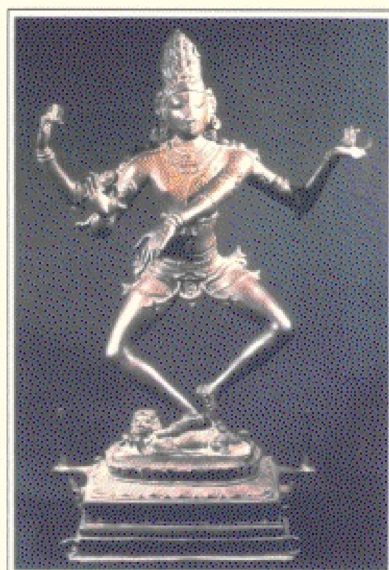
vessels, and also appear to have made some jewgreat development in metallurgical skills from the inception of this civilization to its
decline. From the earliest excavated
elry by similar forming techniques, particularly the
levels, techniques are evident that are also
gold 'cones'. The decorative use of forming includes characteristic of the later mature Harappan. The Harappan metallurgy, therefore, cannot

be studied in context with time. On the other hand, the scope of Harappan metallurgy and metallurgical skills is expansive and is truly impressive in terms of space. A great diversity of copper and bronze objects has been found in all Harappan sites. These include

Mohenjodaro, Chanhu-daro and **The famous Harappan Dancing Girl (National Museum, Delhi)** Allahdino in the south; Harappa and



Dancing Girl from Mohenjo-daro
(National Museum, New Delhi)



Chaturatandava Shiva from Tiruvarangulam
(National Museum, New Delhi)

The next stages are alloying and casting. When copper is alloyed with tin, lead, arsenic etc. casting is easier and the product obtained is superior. A good quality bronze is obtained by alloying copper with 8 to 11 per cent tin. In the bronze objects from Mohenjo-daro the presence of tin is 4.5 to 13 per cent. Surely, the mixing was deliberately done to obtain suitable bronzes. The Harappan metallurgists were able to work not only with open moulds but, as we have seen, also with the advanced and complex lost-wax process. Most of the Harappan tools are simple. But their razors, chisels, arrowheads and fishhooks are among the best in the Ancient World. They had also made the true saw and were using tubular drills for making fine steatite beads.

How did the Harappans happen to achieve this metal prosperity and technological status? It is rather a difficult question to answer, because the pre-Harappan developments of copper-bronze metallurgy are not sufficiently clear. The mountain region extending from Anatolia to Afghanistan is rich in copper ores, more so its eastern side. Presently the site Tal-i-Iblis near the Kerman range in south-east Iran is regarded as the earliest known centre of copper metallurgy. The smelting equipment discovered from this site is datable to *circa* 4500 B.C. From here the knowledge is believed to have spread to the west and the east. Towards the east Mundigak in Afghanistan and some pre-Harappan sites from Baluchistan provide evidence of copper and bronze metallurgy.

The pre-Harappan (*circa* 3500-2300 B.C.) sites (Nal, Kulli, Mehi etc.) discovered in Baluchistan are rich in copper and bronze objects. The Mehi cemetery among its grave-goods has yielded a unique copper mirror 12.7 cm in diameter, having a copper handle representing a female figure with breasts and arms akimbo; the head is provided by the reflection of the mirrror's user! There is nothing like the Mehi mirror in the contemporary Western Asia, nor in the later more advanced Harappan culture. This shows that the Baluchi metal-smiths of the period were well-acquainted with copper-bronze metallurgy.

In the Harappan culture it is a full-fledged technology. What were its sources of copper? Baluchistan, Afghanistan, Oman, Rajasthan and Bihar all have copper mines. But it could not have been possible for the Harappans to exploit the distant mines, such as that of Bihar. Analyses of copper-bronze objects and ores from several mines suggest that the Harappans must have obtained much of their copper

Kalibangan to the north; Lothal,

Surkotada, and Gola Dharo to the

Forging is the mechanical stretching of metal, usually by hammering the metal on anvil or stake.east; and several other sites in The main source of evidence of forging comes from between. These objects represent a

An animal figurine cast in bronze, from Harappa

An animal figurine cast in bronze, from Harappa

(after Kenoyer)

(*Kenoyer***)**

metallographic examination of artifacts. Forging not
vast array of fabrication techniques.
only shapes the object, it also hardens it and so the use of stamps or punches, hammering of thin

forging is an important step in the manufacture of The Harappan used copper and its alloys to make weapons and tools as well as utensils edge tools. Forging can be done while the metal is metal sheets (often gold) into or over patterns, and hot or cold. Annealing is reheating of an object after

and ornaments. Nearly all the basic tool-types - flat axes, chisels, knives, spearheads
chasing. Simple circular punch marks were used in
and arrowheads, small saws, etc - would have been made by simple casting, and/orworking and most of the metal-working involves the decoration of gold objects and fillets and sheet
chiseling and hammering. The flat axes, usually stocky and of sub-rectangular form cycles of annealing and hot and cold forging. There metal was beaten out from one side to make de
is evidence for forging during the Harappan phase
with splayed edges, and the mirrors were cast in open molds. The chisels and thicksigns. The Harappans used a large variety of pots
and pans. Compared to the early Chinese bronze
(9,31).
blade knives were hammered from square– or round-sectioned rods. All of the objects
vessels, these were nowhere comparable in comMost of the objects seem to have thin flatof thin sections, i.e., knives, arrows, spearheads, razors, and saws, were chiseled from sections, e.g., razors, arrow-heads, knives, spear

plexity and decoration but were simple utilitarian sheets of thin roll hammered copper. The techniques of raising, hollowing, sinking,
pots. Generally, the Harappans were using sinking

riveting, lapping, and soldering are also known to have been practiced, as is evidenced from the

artifacts recovered from the core Harappan sites. [389]
Not very many molded bronze objects have been found in the excavated Indus sites but whatever is available shows that the Harappans felt quite at ease in casting the molten

and raising to beat the metal disc and shaping it into desired pot-forms, the techniques that have been used till very recent times in Punjab and still being used in Haryana in India.

Although there are abundant examples of copper and silver wire production their production has not been studied at all. Wires were used to make rings possibly for adorning the fingers, toes and ears as well as for other purposes. Some stone beads have pieces of copper wire inserted through the hole, possibly in imitation of the method seen with the gold wire, so that the beads could be hung as pendants form a larger composite necklace. Occasionally, reports of copper 'drill bits' found stuck in bead may be such fragments of copper wire. Traditionally copper wire is produced by passing a carefully hammered copper rod through a steel drawplate, which has a series of progressive small holes. It is perfectly possible to draw copper or copper alloys through the drawplate of the same material.

Today three welding processes are known pressure welding, surface welding and fusion welding - but perhaps these were not resorted to in Harappan times. However, the Harappans used a number of other techniques for joining two copper pieces. *Lapping* is a technique by which two parts (say of a vessel) can be placed one *above* the other and joined. This was probably used by the Harappans, for example, for joining tubular handles. Cleaned parts could also be joined by pouring molten bronze over them. Several vessels from Mohenjo-daro, in Sana Ullah's section in Marshall's report, show signs of *running* on, as this process is called. Short rods of metal hammered on both ends (rivets) were used to join various metal parts. Both Childe (1957) and Marshall (1931) have reported *rivetting* in the Harappan artifacts. In *soldering*, one uses an alloy different from the metals to be joined. The advantage is that one can join at a much lower temperature than the melting point of either of the metals to be joined. However, no case of copper soldering has been reported from the Harappa Civilization, though gold and silver-soldering have been reported.

Gold, Silver, and Lead: *Gold:* There is as yet insufficient evidence in the subcontinent to indicate the character and use of gold in pre-Harappan. With the Mature Harappan period there is more evidence. Objects of gold are reasonably common, though by no means prolific. Gold occurs in the form of beads (some of minute size), pendants, amulets, brooches, needles, and other small personal ornaments, including small hollow conical caps with interior soldered loops, doubtless probably as forehead ornaments, identical with modern examples. No doubt gold, because of its attractive appearance, was one of the first metals to be sought after by man. Much of the Harappan gold is of light color indicating a high silver content; or rather it is unrefined electrum (Electrum is a naturally occurring alloy of gold and silver, of and, with trace amounts of and other metals). This suggests that it originated from the quartz reefs, rather than from panning.

Gold ornaments or flakes of gold leaf have been recovered from most excavated Harappan sites. All of the relatively complete pieces of gold ornaments have been recovered from hoards where objects have been stored in copper or ceramic vessels and buried within a house. Fragments of gold leaf or tiny beads are not uncommon in the excavations of Mature Harappan sites; the gold leaf may be derived from beads or other objects that were covered with decorative gold, and the tiny beads undoubtedly derive from broken necklaces. Only a few small gold beads have been recovered from

Harappan burials.

Very little of the gold recovered from Indus Valley Tradition sites has been subjected to chemical analysis. The earlier excavators used visual criteria to discriminate between pure gold and a gold/silver alloy. The gold/silver alloy was thought to be either a natural electrum or an artificial alloy made by the Indus gold/silversmiths. Two gold objects from Lothal revealed 33.45 per cent and 41.48 per cent of silver. Lal concludes that a high percentage of silver and the absence of lead indicates that these items were made of electrum, rather than an artificial mixture of silver (derived from galena) and gold. Recent analysis to determine the over all ratio of gold to silver, of a few gold samples from Harappa, has indicated the proportion of gold to silver to be between 91 per cent and 94 per cent (16). The gold/silver object from Harappa was a lump of partly melted and hammered metal visibly composed of gold and silver. The gold-colored portions had a high ratio of gold to silver and the silvercolored portions had a high ratio of silver to gold. This object was obviously in the process of manufacture, and may reflect a stage in the production of artificial gold/silver alloy.

There has been much discussion on the possible origin of Harappan gold and, as with copper, there are several potential resource areas. While some earlier scholars considered the South Indian gold mines as a major source area, there is no conclusive evidence for trade between the Indus cities and the contemporary hunter-gatherer societies of South India. The most obvious source of alluvial gold is the upper reaches of the Indus Valley itself and the streams of northern Afghanistan. Significant quantities of gold are found in the tributaries of the Amu Darya, and the Kokcha river itself cuts through deposits that have gold ores. The extraction of gold from the sands of the Indus and one of its tributaries, the Jhelum, in particular, is attested by the accounts of Herodotus, Megasthenese and Pliny. In historic times the Indus Valley was known for its gold.

Like copper, few indications of gold working have been uncovered in the archaeological investigations of the Indus Valley. The most convincing indications to date of gold working at a Harappan site have been found at Shortugai in Afghanistan, where the excavators found a fine globule *(gouttelette)* of gold imbedded in the cuprous vitrified internal surface of a crucible fragment (32).

Silver: Silver is not known in the Early Indus times and it makes its earliest appearance in the Harappan Civilization itself. That silver was relatively more common than gold in the Harappan Civilization is indicated by the number of large vessels made of silver, and by the frequency of other finds. There is no silver at Lothal and Kalibangan or even Chanhu-daro, whereas silver vases, bars or lumps, bangles, a seal and other artifacts occur at the two major cities of Harappa and Mohenjo-daro. Among examples of finer workmanship is a silver buckle from Harappa, with soldered scroll pattern of gold wire and gold-capped beads, and a boss of silver inlaid with conch-shell.

Silver was used primarily to make vessels that were similar to copper metal or ceramic forms. Silver ornaments are also quite common and include beads, bangles, and rings, as well as fillets and perforated discs. Marshall claims that silver objects were more common than gold, in contrast to Mesopotamia or Egypt, where silver was rarer. Asthana (33) also notes that silver was much more common at Mohenjo-daro and Harappa than at Lothal and Kalibangan. Nevertheless, only five samples of silver have been analyzed, two from Mohenjo-daro and three from Lothal. They all contain significant traces of copper, and three contain lead. The sources of Indus Valley silver are not known, but on the basis of copper and lead traces in their samples, Sana Ullah suggested that most of the silver from Mohenjo-daro was extracted from argentiferous galena. The presence of silver mines

in Baluchistan and Afghanistan have been noted, but to date no Harappan Phase extraction sites have been reported. Silver deposits in the Aravallis are enthusiastically described, but again there is no evidence for its exploitation until after the Harappan Phase; the earliest dated mines are from the second millennium B.C.

It is interesting to note that silver objects imitated copper objects and the silver utensils almost always duplicate those made in copper and terracotta. Even the most valuable metal containers, such as the silver jars with lids from Mohenjo-daro, are made in the same style as tall ceramic vessels with flaring rims. In cases such as this, where function does not appear to have been a factor, the pervasive use of a specific shape demonstrates the important cultural symbolism that the shape of vessels conveyed or it indicates an inherent conservatism which such examples demonstrate. The similarities in shape and style of pottery and metal vessels may demonstrate the vertical integration of different classes within a large cultural system, whereas the differences in raw materials help to reinforce the social and economic hierarchies.

There were several possible sources of silver within the Indus territories, the most likely being the area around Nal in Jhalawan area of Baluchistan. There were also several sources in the borderlands to the west and the northwest. The area around Panjshir in northern Afghanistan especially comes under consideration. These mines were famous in the early medieval times. This source becomes likelier when we consider that the valley lay astride the best route connecting the Indus basin with Shortughai on the Oxus river in northeastern Afghanistan. Silver mines are known to have also existed in the vicinity of Hearat but it is difficult to determine if the Harappans in fact had any close link with this westerly area of Afghanistan. The ores used to make Indus Valley lead could have been cerussite (lead carbonate) or galena, which is found in many regions of Baluchistan

Lead: Lead is plentiful in Mohenjo-daro and has been extensively reported in Harappan artifacts. It is also present in copper as an impurity and this rendered the metal easy to mold. Lead might have been also used as a smelting flux. This is evidenced from the discovery of copper ore together with a small piece of lead in a bricklined pit in a house at Mohenjo-daro. Rajasthan, Behar and Orissa in India have been sited as the sources of lead by some archaeologists. This is, however, very unlikely since lead was being smelted by the people of the Nal culture (Jhalaswan area of Baluchistan) even before the emergence of the Harappan Civilization. Lead mines of Faranjal in the Ghorband Valley of Afghanistan and those at Hazarajaat could be other sources of lead. It has been hypothesized that the Indus cities also imported lead in ingot form but there seems to be no archaeological evidence for such a supposition.

Numerous lead objects have been found at Mature Harappan sites and it is clear that lead was used as a separate metal. Small masses of metallic lead were found in the excavations at Chanhu-daro and a number of lead objects have been reported from Mohenjo-daro and Harappa. One object from Mohenjo-daro described by Marshall as a "netsinker" has a rough convex surface that appears to have been cast in sand. This object has been examined by Kenoyer and appears to be a planoconvex disc-shaped lead ingot. There is a perforation in the center and a lateral perforation that extends across part of the flat surface. Other forms of lead objects include vessels, such as a lead dish, lead cones, and so-called "plumb-bobs" (Marshall). Another use for lead is seen in the form of a rivet used to fill a hole in the bottom of a shell ladle. Lead may have been deliberately added to a few copper objects and may have been important for casting, as the addition of lead causes molten copper to flow more easily. One lump of lead from Mohenjo-daro analyzed by Desch was composed of 99.7% lead and

0.15% copper and had traces of silver..

Numerous lead objects have been found at Harappan sites and it is clear that unlike tin, lead was used as a separate metal. Lead may have been deliberately added to a copper alloy, as the addition of lead causes molten copper to flow more easily. The lead ore, cerrusite and galena have been reported form Nal in Baluchistan and Mohenjo-daro respectively. These ores are found in many regions of Baluchistan. Besides, small masses of lead were found in the excavation at Chanhu-daro.

Conclusion: Metallurgy is an important aspect of pyrotechnology. Here the Harappans did introduce some ground-breaking innovations to the existing technology of the Early Indus period. From the very beginning, there is a substantial evidence for copper and bronze technology and the use of copper and its alloys is quite common in the Harappan cities, small or large. Clearly, there was easy access to this metal within the traditional realm of the Indus. Similarly, there was silver, gold and lead which the Hardpans utilized for different purposes. Archaeological evidence at excavated sites shows that the number and variety of stone tools decreased as the metal tools and impliments increased and that there was a direct causal connection between the two.

Evidence points to the impression that the Harappans had a good general understanding of the alloying process. However, they do not seem to have as good a mastery of the metallurgical knowledge as did the Mesopotamians. Their biggest failing in metallurgy was perhaps in the fabrication technology. The absence of hafted axe in the Harappan civilization, despite the fact that it was widely known in the neighboring countries to the west, and rather poor samples of saws are the evidence of such a failing. On the other hand, the fact that some excellent examples of cast bronzes, for instance the ’Dancing Girl, have come to light and these certainly indicate a high level of casting techniques known to the Harappan.

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Chapter 18

Indus Copper and Copper Alloys



In the last chapter we discussed the state of the Harappan metallurgical technology in its generalities. The Harappan Civilization is, however, known for its copper and copper

alloys and the artifacts made of them. This chapter is the focus of these aspects of the Harappan metallurgy and its relevance to the Harappan economy and the social milieu of the Harappan society. The debate on the sources of copper ore or metal is ever present in such a discourse and, despite a lot of controversy, we try to deal with it as best as we can.

We review the existing data sets for the production and consumption of copper-base objects at Indus sites, outline a working typology for metal objects, and provide some data from on-going analytical work on the copper assemblage from Harappa. The role of metals in the economic and social networks of the Indus tradition is examined in terms of patterns of use and technological style. We especially note the prevail question if the Hardpans produced their copper from smelting the ore or acquired it from sources other than the Indus. Object production may not have involved elaborate forms, but may have involved complex alloying. We also point the readers to the publications available, and consider the case of Indus technological style for all stages of production. We then turn to consumption, reviewing typologies of Indus metal objects and past conclusions about use and distribution of copper-based artifacts. Finally, we discuss the relationships between metal consumption and social values.

There have been several major synthetic reviews of Indus copper metallurgy in the past decade, including Chakrabarti and Lahiri (1), Kenoyer and Miller (2), Agrawal (3), and Agrawal and Kharakwal (4) . These works provide comprehensive reviews of the nature of the evidence and the current state of interpretation up to the mid- to late 1990s. A more recent review is that of Brett C.

Hoffman and Heather M.-L. Miller (5) and we include quite a bit of material from this review.

Copper objects have been recovered from each of the major excavated Indus cities as well as smaller sites. Perhaps no other raw material besides clay was employed by Indus people to produce such a diversity of forms. Evidence from excavations indicates that copper and bronze were used to make tools, such as knives and saws; weapons, such as spears and arrow points; jewelry, such as beads, rings, and bangles; household materials, such as dishes and other vessels; and items of possible economic control or religious importance, such as scale pans and tablets. Despite the number of copper artifacts that crosscut all aspects of Indus life, the material remains critically understudied. This is not to say that analyses of copper and bronze objects have not been undertaken. The goal of determining the sources of Indus copper has traditionally been the major focus of Indus metallurgical studies. However, there has been little work done regarding the specific uses of copper at Indus sites, and few detailed typological categorizations or examinations of changes over time in the copper and copper alloy assemblages. Notable exceptions to this include Yule's (6), typologies of copper objects from the major excavations at Mohenjo-daro, Harappa, Lothal, and other Indus sites; work on excavated material from Chanhudaro by Heidi J. Miller (Miller, H. J. (1999a). A functional typology for metal objects from Chanhu-daro. In M. Taddei & G. De Marco (eds.), South Asian archaeology 1997, Rome); and a discussion of use and consumption at these sites by Kenoyer and Miller (2), which also includes a summary of catalogues of Indus and related metal objects published before 1996. The synthesis of Hoffman and Miller (5) is also an important contribution in this regard.

Work being undertaken on copper and copper alloy assemblages in the regions adjacent to the Indus Valley plains is essential for contextualizing the Indus copper metallurgical tradition. Such work includes summaries and typologies of materials from India (1). All this work will allow future examinations of regional variations in metallurgical traditions within the Indus world as well as comparison of Indus traditions with neighboring traditions. The work on Afghanistan, Central Asia, and Iran is sorely wanting.

Although there are some new publications on Indus copper, as noted above, the vast majority of these works focus on metal object descriptions, lists of compositional analyses (often reprints from older excavation reports), and discussion of sources of the metal ores. These are all useful. Figure 2 shows a generalized model of the process of production for copper and its alloys. Metal production processes can be divided into raw material procurement, mate

decade, including Chakrabarti and Lahiri (1996), Kenoyer and Miller (1999), Agrawal (2000), and Agrawal and Kharakwal (2003). These works provide comprehensive reviews of the nature of the evidence and the current state of interpretation up to the mid- to late 1990s (note that Kenoyer and Miller 1999 was submitted for publication in October 1996).rials preparation, primary production of metal from tional issue that any discussion on it would necesThe outline of copper production presented here is essentially the same as that presented in

casting and fabrication). We begin with the proon proving that the Harappans depended on the

Kenoyer and Miller (1999), with additions and corrections from the few

subsequentcurement of raw material, i.e. the sources of copper sources of metal ores from within the borders of the
publications with new information on Indus metal production. Here we also summarize and

Harappans is important from historic as well as boils down more to the selling of Khetri and other geographic perspectives.Whether smelting of this

expand the discussion of typology and the consumption of copper objects, particularly in

mines in Rajasthan than a rational enquiry of the

Indus cities. Through an analysis of the types of forms that are fashioned from copper and

brought to the Harappan sites) or the smelting was torians then routinely mention these sources as done in or around the Harappan sites is a different

the archaeological contexts that they are found in, we propose some hypotheses for the role

though it was a proven fact without siting any scien

that copper played in the larger economic and social reality of Indus cities.tific evidence to substantiate such claims. They

large. spend considerable time in describing the copper **The Debate on the Sources of Copper Ore:**

The Indus Civilization refers to the complex urban tradition that spread across the

mines around Arrivalli in Rajasthan forgetting that

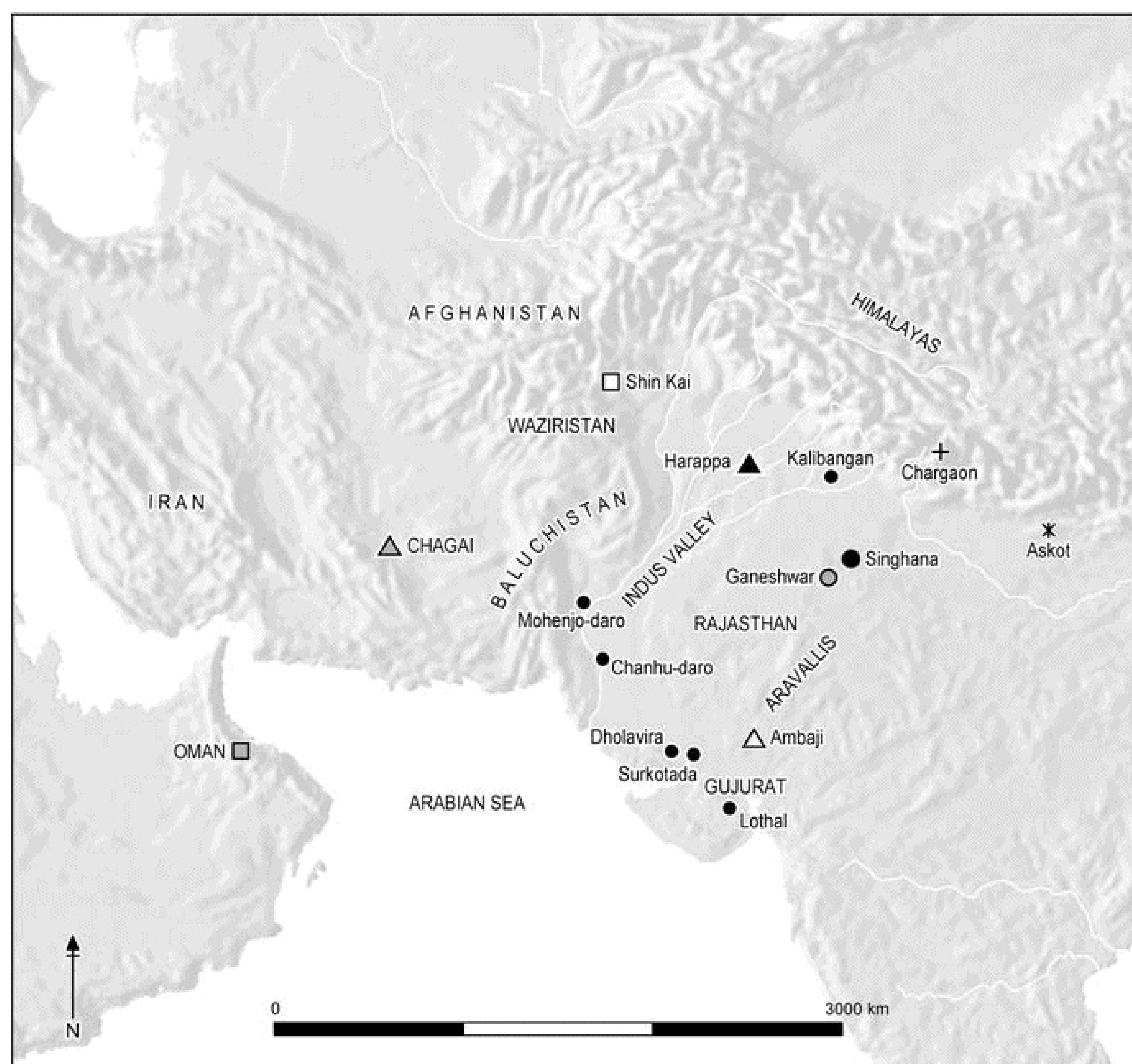
alluvial plains of northwestern South Asia (Fig. 1). Centered on the twin river systems of

the Harappan copper and its alloys is full of confuposits exist within the core area of the Indus world sion and controversy. Indeed, thanks to some In

the Indus and the Ghaggar-Hakra, the Indus Civilization expanded to encompass vast

and the neighboring area of Afghanistan with which
dian archaeologists, such as Chakrabarty, Agrawal,

Joshi, and Khrakwal, it has become such an emo
the Indus people had long-standing cultural relationship. Most of the western as well as Indian



Map of sites and copper ore locations discussed in text (*Hoffman and Mille*r**)** Fig. 1 Map of sites and copper ore locations discussed in text

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scholars also routinely bring in Oman as the source of Harappan copper or its ore. Las Bela; Zhob Valley; Robat and Shah Bahlol in Chaghai region of Baluchistan are mentioned but only as an afterthought. In fact, Baluchistan and Afghanistan boast the largest copper deposits in the world. Added to this difficulty is the fact that most of the objects analyzed from Harappan sites have been finished copper metal objects, and few analyses have been done on copper ores, slags, metal prills on crucibles, or ingots. The systematic comparison of Indus Valley copper with copper ores from the variety of sources available has been sorely neglected. This is due in part to the lack of archaeological samples of ores, and in part because many of the ore mineral deposits potentially used in the past are located in border areas or the regions of political unrest that are not easily accessible

to modern researchers (e.g., Baluchistan, Eastern Iran, and Afghanistan). to highland Badakhshan. This extensive region contains numerous copper deposits and appears to have the earliest evidence for copper processing in historic times. A second potential source of copper is the inland mountain range of modem Oman on the other side of the Arabian Sea. A third region, to the east of the Indus and Ghaggar-Hakra Valley, comprises the north-south oriented Aravalli mountain range of Rajasthan. Numerous concentrations of copper ores are found in these ranges along with zinc, lead, and silver ores. A fourth potential source may have been eastern Iran, but so far there is no clear indication that the Indus metalsmiths used Iranian ores or metal, so this source is generally not discussed.

Most of the discussion of sourcing of Harappan Phase copper metal has revolved around the presence or absence of arsenic, since it is usually assumed to be an impurity rather than a deliberate


Native copper, imbedded in its ore

The systematic pursuit of Indus ore sources has been difficult, due to a number of factors. The complexity of sourcing studies in general is compounded by the fact that the Indus civilization had numerous likely source areas for metals, particularly for copper. Each of these source areas has its own geologically complex mineral deposits. Preservation of metals is extremely poor at most Indus sites. There are also potential problems with what appears to be a high degree of metal recycling at some Indus sites, which might be addressed if studies could be focused on copper slags, ingots, and prills from remelting sites, as well as finished objects. The location of some of the potential ore/ingot sources in border areas or tribal regions that are not easily accessible to modern researchers (e.g., Baluchistan and Afghanistan) is a major issue that has been a problem for several decades now.

Objectively speaking, there are three, possibly four, major regions that could have supplied the copper ores or processed metal used by the Indus metalsmiths. The first is the combined area of Baluchistan and Afghanistan, to the west of the Indus Valley, which extends from highland coastal Makran


A sample of copper ore

alloy, and thus indicative of the source of copper. At the Indus Valley urban centers of Mohenjo-daro and Harappa, the great majority of the objects that were analyzed contain at least trace amounts of arsenic, usually less than 1%. The overall composition of the copper items from the smaller Gujarati sites of Lothal and Rangpur (late- or post-Harappan) is very different. While these sites contain artifacts with variable amounts of nickel and iron, arsenic is noticeably absent. On the contrary, the two major cities situated in the actual Indus Valley flood plains were using copper derived from sources containing significant amounts of arsenic. These sites were part of the major trade and exchange networks connecting the western highlands, the central plains, the eastern riverine areas, and the coasts of the Indian Ocean. The most probable source areas for arsenical copper ores are the mines of Baluchistan and Afghanistan. On the other hand, it is important to note that copper slags and objects containing arsenic *have* been reported from copper processing sites in Oman. This makes Oman as an unlikely source of Indus copper. The absence of arsenic from the finished objects at Lothal and Rangpur (both of them of Late Harappan period) could, therefore, be taken as circumstantial evidence for the exploitation of the Aravalli copper ores in Gujarat.

In the highland plateau west of the Indus Val
Metallurgy and Metal Artifacts**!**
Afghanistan and Central Asia was substantially
ley flood plains, numerous copper-working areas more than that in the Indus Valley, indicating wide
have been reported over the years, but the most
for another reason. The contemporary use of copper in Afghanistan and Central Asia
spread copper smelting activities in these areas
impressive is the region of southern Afghan Seistan,was substantially more than that in the Indus Valley, indicating widespread copper
often referred to as Gardan-i-Reg. Here in the windchistan and, for that matter, in the sub-continent as
swept wastes of the Helmand Basin, there are vast
smelting activities in these areas before the art of copper smelting took hold in
a whole. Given the familiarity of the Baluch and Af
areas of exposed copper slag mixed with pottery
Baluchistan and, for that matter, in the sub-continent as a whole. Given the familiarity
ghan terrain to the Harappans, and given the long
and other cultural debris. Dales (7) mentions thatof the Baluch and Afghan terrain to the Harappans, and given the long-standing culturalstanding cultural intercourse between Indus Valley some of this
slag was analyzed and contained 14%
intercourse between Indus Valley and
copper, and that the gold assay was also quite high,
these regions, the possibility

but most of the samples have yet to be studied. The
copper ores processed at Gardan-i-Reg are asHarappans using their ‘own’ ore is
sumed to be from nearby deposits. The ceramics ofand other cultural material associated with the copmore logical than that

venturing into Rajisthan, a land which per smelting debris of Gardan-i-Reg correspond to
the Helmand Tradition at the sites of Mundigak,has been completely foreign to them
Shahr-i Sokhta (Period III), and Tepe Rud-e Biya
and to their ancestors.

ban. The dating of the ceramics is disputed and
while some scholars feel that they fall between ap
proximately 2500-2400 B.C., others suggest thatA definite answer to the question of the
they date to the period prior to 2600 B.C. The copsources of copper is rather impossible to
per smelting activity would be basically contempo

obtain on the basis of chemical analysis
raneous with either the late "Early Harappan" or the

Mature Harappan Phase of the Indus Age. The ocalone. First, it is obvious that the whole
casional discovery of Harappan artifacts at sites inHarappan area is not likely to have
Afghanistan indicates that there was movement of

obtained copper from a single source,
people and goods between this important mineral
resource area and the greater Indus region.and the pattern of impurities in copper
Copper ores that are rich in arsenic are alsoattests this. For example, the copper at
found
in
vast
distribution areas in Baluchistan:

Mohenjodaro and Harappa contain
Saindak copper mines in Chaghai area is one ex
ample and Reko Diq is another. Chagai is anickel and arsenic while Lothal copper
sparsely populatedis arsenic free. Second, the Harappan
Baluchistan and is located in Tethyan Magnetic Belt

Arc,
extending
copper and bronze objects have most
through central and southeast

Europe Turkey, Iran and Pakistan. Sandal and Reko likely been melted and remelted several
Diq mines, discovered in the 1970s are located inof the scarcity of the
this belt. There are, of course, several other copper

metal. In this process, the true identity

mines, some of them mentioned above, in this vast
region. Copper has also been located between Ziof the ‘virgin’ metal has been lost. This
of the
much
times because



arat and Sohan in Sarawan region.
Isolated copper homogenization of composition, of A bird-eye view of Chaghai copper-bearing area in ore deposits are also found in south Waziristan in **A bird-eye view of Chaghai copper-bearing area in** course depending on region to region,
Baluchistan the north of Baluchistan. There is historic evidence

that some of these mines were working operations has resulted in the metal that contains a but it is not clear if these ores were being exploited mix of impurities, such as arsenic, tin, and lead. Thus, any inference from purelyand these regions, the possibility of the Harappans continuously or only at specific chronological peri analytical results would be faulty in its very nature. using their 'own' ore is much more logical than thatods. Further northwest, Huan Tsang, a seventh cenof venturing into Rajasthan, a land which has been tury pilgrim from China, mentions copper mines in foreign to them and to their ancestors and one that Afghanistan and ancient workings have been lo
In passing the matter of Oman must also be touched upon. The Lothal copper is said to was separated from the Indus Valley by a vast de cated near the Sofed-Koh between Kabul and Kur sert, the Thar. be arsenic free. This fact points to Oman as a source since copper there is supposed to ram. Shah Maqsud also contains rich veins of copbe also arsenic free. Rao supports this hypothesis by further observing that Oman was per ore and it is said that Nadir Shah exploited Ketheri was originally indicated by Marshall, the them. Rich ores also occur at Nesh, about 100 km apparently supplying copper to the Sumerian cities since their copper tools were also chief excavator of Mohenjo-daro. At the time when from Kandhar.free of arsenic. Later investigations, however, proved this analogy to be false since southeast of Kabul, are well-known where the Chi Marshall was digging at Mohenjo-daro, the sources nese are developing a rich vein at Aynak. All these Agarwal himself found 88 percent of the Mesopotamian artifacts containing arsenic.

areas are within the purview of the Harappan activi not widely known. There were, however, some cop ties. per mines near Khetri in Rajasthan (India) whose Page 378historicity was a common knowledge. It seemed quite logical to Marshall, therefore, to hypothesize

The exploitation of sources from Baluchistan, as well as that from Afghanistan, is plausible for another reason. The contemporary use of copper in that the Harappan copper ore might have come from Khetri. This speculation, borne of factual ignorance, was repeated by subsequent archaeologists with such a frequency that it became almost a historical dogma. There is much more known about the mineral geography of the region now than was known even a few decades ago.

In 1971, D.P. Agarwal published a monograph on *The Copper-Bronze Age in India* (3). He also wrote a number of papers on the subject. His studies are primarily metallurgical and according to him there is strong possibility that the Rajasthan mines were the source of the Harappan copper, as proposed earlier by Marshall. He did not offer any convincing evidence for this hypothesis and the later analysis proved him wrong in this proclamation. The irony is that while Agarwal, like Marshall, only claimed a 'possibility' of Rajasthan as a source of Harappan copper ore, later writers made it a certainty, a certainty to the extent that Rajasthan gradually became a proven source of the Harappan copper (1). Rajasthan was an important source of copper ore but it was *after* the Harappan Civilization had already bloomed and withered away. As far as the technological base is concerned, Agarwal came to the conclusion that metallurgical know-how in the Indus Valley was derived from west Asia while the continental India derived its knowledge either indigenously or acquired it from southeast Asia. Here too the evidence is sorely missing.

At this point there is no direct evidence for mining or smelting sites in the Aravalli copper resource areas during the Harappan Civilization, even though these areas have been explored by numerous

scholars. The earliest well-dated copper smelting slags are from levels of Ahar dated to the early second millennium B.C. Although Hegde and Ericson (8) assumed that the smelting furnaces they found in surface surveys in the Aravallis are from the late third millennium B.C., these furnaces have not been dated, either by radiocarbon or by associated artifacts. If these sources were actually being exploited as early as the third millennium B.C., it is more likely that the Indus peoples themselves were not involved in the mining and smelting: These activities may have been undertaken by local communities of the Aravalli region.The GaneshwarJodhpura Culture in northern Rajasthan or the Ahar Culture in southeastern Rajasthan may in fact be some of these groups but they chronologically belong to the late- or post-Harappan timeframe.

It is true that many Mature Harappan sites have been reported in the desert region of Cholistan, Pakistan, along the now dry bed of the Ghaggar-Hakra River and on the western ridges of the Thar Desert. Many of the sites discovered by Mughal have kilns that were apparently used for "firing pottery, clay objects, bricks and perhaps smelting of copper" (9). Although this region is close to the copper source of Rajasthan, these sites cannot be classified as copper smelting sites in the absence of other indicators like ores, slag heaps and smelting furnaces (2). Furthermore, there is no indication at that these settlements had any cultural contacts with the region to their east.

Comparing the composition of the ores from different area with that of the Harappan artifacts has proven largely unproductive. Another approach, advocated by Freidmann is to study the nature of impurities present in the Harappan artifacts and compare them with those in the copper ores from different areas. By using this method one can identify the ore-types used by studying the concentrations of Ag, As, Fe, Bi, Pb and Sb in copper artifacts. On this basis copper ores from Baluchistan were initially ruled out because several Harappan copper tools indicated lead in them and lead was ostensibly not present in the ores tested. Conversely, based on the presence of arsenic, nickel and lead in articles from Mohrenjo-daro and Harappa, Rasjasthan and some Afghanistan mines were sited as sources. D.P. Agarwal made spectrographic analysis of some Harappan artifacts and various ores from the region, taking twenty elements into consideration. All these analyses showed that Harappan copper objects had arsenic, nickel and lead, just like the Khetri ore from Rajasthan. The conclusion was obvious: the Harappan got their copper ore from Rajasthan as Marshall had originally hypothesized.

It was, however, later shown that Agarwal’s samplingg was seriously flawed, especially with the copper ores from Baluchistan. More recent studies have contradicted his findings by showing the availability of a wide variety of these ores in Baluchistan and the presence of lead in some of them. The Baluchistan’s ores analyzed by Agarwal and others came from Robat and Shah Behlol instead of Chagai, thus cutting off the very basis of the analysis. The Chaghai ores do contain arsenic, tin and lead and they were present right at the doorsteps of the Indus people. Some Afghanistan sources also contain arsenic, nickel and lead and, therefore, it may be possible that these sources were also used. After all, Indus-Afghan contacts were regular, sustained and enduring for the millennia past and for the Harappans the exploitation of natural resources from this area would have seemed nothing but natural.

Bhardwaj (10) discussing the probable copper mines that may have been exploited by the Harapans, also gravitated to Rajasthan as a source of copper ore but adds a few other sources including Ras-Kuh, Khawja Amran ranges as well as Shah Bahlol and Robat in Baluchistan, ther copper ore sites then known. In spite of his leaning to Rajasthan as a source of copper ore, Bhardwai does make the

concession: “On account of the presence of lead in the Mohenjo-daro copper objects the sources of Baluchistan and Afghanistan have been suggested” (10).

As stated earlier, Aravalli copper ore is low in arsenic; so are the finished objects at Lothal and Rangpur in Gujarat. This could be taken as circumstantial evidence for the exploitation of the Aravalli copper ores at least by Gujarat Harappans. There is, however, no direct evidence for Harappan mines or smelting sites in the Aravalli copper resource areas even though these areas have been repeatedly explored by various scholars. The earliest well dated copper smelting slags comes from Ahar dated to the second millennium BC (8). Although Hegde and Ericson (8) assumed that the smelting furnaces they found in the Aravalis are from third millennium BC they have not been dated either by radiocarbon or associated artifacts. These sources were definitely exploited by local communities of the Aravalli region and the Ganeshwar culture, and Aharians may have been one of these groups. These cultural groups post-date the peak of the Harppan Civilization and therefore if these sources were exploited by the Harappans, it could be possible only in late or post-Harappan periods. To avoid this difficulty, Rao insisted that arsenic-free Lothal copper came from Oman, rather than from Rajasthan (11). Omani copper ores are similar to those of the Aravalli region. Both these areas have little or no arsenic, but have cobalt, vanadium and chromium (12). This brings us to Kenoyer and Miller’s third possible region of Harappan copper ore; that is, the inland mountain range of modern Oman and eastern Iran.

Some bun shaped ingots and large number of copper objects were found at Lothal. On this basis Rao (11) thinks that copper was imported from Oman and purified at Lothal workshop and ingots were exported. A connection between Oman and the greater Indus region was inferred from the presence of Harappan artifacts and possible short-term Harappan settlements in Oman, combined with the presence of shells from Oman at Indus sites. By taking advantage of the monsoon winds, Indus maritime traders may have been marketing Arabian copper in the Indus Valley, Baluchistan, and Gujarat.

Much research has been conducted in the important copper mining regions of Oman. Omani copper ores are similar to those of the Aravalli region of Rajasthan in that they have little or no arsenic and have relatively high quantities of nickel, cobalt, and vanadium (12). Omani copper ores are similar to those of the Aravalli region of Rajasthan in that they have little or no arsenic and have relatively high quantities of nickel, cobalt, and vanadium (12). They are different from Iranian, Afghani or Baluchi ores. The Lothal copper is also said to be arsenic free.

Rao supports this hypothesis by further observing that Oman was apparently supplying copper to the Sumerian cities and their copper tools were also free of arsenic. Later investigations, however, proved this analogy to be false since Agarwal found 88 percent of the Mesopotamian artifacts containing arsenic. Furthermore, the Oman copper ore is *not* arsenic-free! On the other hand, the analysis of as many as 300 copper objects from Lothal showed that none of them contained arsenic. Thus, there is no reason to insist that the Saurashtrian copper came from Oman.

Chakrabarti (13) supports Rao’s hypothesis. The presence of nickel as a trace element in the ore of the Oman region and the high nickel content of the Lothal copper bronze objects perhaps led Chakrabarti to support this view. But David Muhly (14) writes that "nickel is so common that it cannot possibly be used to identify an ore from a specific source". Hence, unless we do extensive ore-artifact correlation studies on the Indus objects, we cannot put forward any final inference. To further support Rao's

hypothesis, Chakrabarti (13) says that one has to explain an apparently widespread Harappan presence in the Omanese peninsula. Ras'alJunayz, of course, is one of the well-known sites in Oman where an inscription with four Indus characters was found incised on the shoulder of a painted jar. But this cannot be taken as an indication that the Harappans were there to acquire copper or its ore. Tosi (15) suggests that Oman was the base for Indus people for further voyage up to the Egyptian coast. He writes, "This locality occupies an even more strategic position on the coastal route from Karachi to the Horn of Africa". In fact, he gives more credit to the Indus people for their contribution in oceanic sea-craft than any other urban civilizations of the Middle east.

Ratnagar is another archaeologist who supports the Indus-Oman connection for the sake of copper. She hypothesizes that it was copper metal rather than the ore that was imported from Oman. Ratnagar (16) went to the extent of connecting the decline of the Harappan Civilization with its ‘dependence on imports of metal’. This hypothesis may be a product of lack of knowledge a few decades ago but is invalid in view of the current knowledge. Those familiar with the distribution of metals and traces of old workings in the Indus distribution area will know that this civilization had absolutely no need to import any metal, copper included, from anywhere. The evidence of Harappan contact in Oman does not necessarily mean that copper was being imported from that direction; copper ores of several compositions were available within the Harappan realm, especially in and around Chagai area in Baluchistan.

Lead Isotope Study: In this morass of uncertainties, lead isotope analysis is slowly being carried out on Indus samples and regional ore sources by several projects; we present initial, preliminary work by Brett C. Hoffman below (5):

Hoffman conducted lead isotope analysis at the Laboratory for Archaeological Chemistry (LARCH) at the University of Wisconsin–Madison to analyze the isotopic characteristics of seven archaeological copper mineral specimens from Harappa and compared them to samples from potential source areas within and adjacent to northwestern South Asia. Wherever possible, minerals were obtained, but slags were also analyzed for some sites. Additionally, the data from South Asia were compared to published LIA values for copper deposits in Oman. Some initial conclusions can be drawn from Hoffman’s research on the Harappa materials, through the analysis of a bivariate plot of the Lead Isotope Analysis results. The preliminary results show that while it may not be possible to identify the specific sources utilized by individual Harappan sites, it is possible to discuss the likely and unlikely sources of copper metals present at sites during a given time period.

Lead isotope analysis is based on the measurements of the four isotopes of lead, three being decay products of uranium and thorium (206Pb, 207Pb, and 208Pb), and the fourth (204Pb) acting as a stable reference isotope. Variations in the three distinct lead isotope abundance ratios can be used to develop models for extrapolating the age of geological samples. Archaeological applications are possible because Pb isotopes do not undergo significant fractionation during smelting or any subsequent manufacturing processes. Therefore an artifact containing lead will retain the original isotopic composition of its parent deposit. As a result, lead isotopes have demonstrated a high degree of utility in establishing source provenance correlations for archaeological metals. Of course for copper artifacts this is a best-case scenario. It is always a problematic possibility that copper from two or more sources could be mixed and other metals or materials may be added during the manufacturing process, any one of which could alter the isotopic characteristics of the finished object.

The result of Hoffman's work can be summarized as follows:
i) None of the samples from Harappa are isotopically related to the modern ore samples from Gujarati ore (Ambaji).

ii) Five, or perhaps, six of the Harappan minerals do appear to be related to one of the sources to the west or south of Harappa, that is, Baluchistan, Waziristan, and Oman. Many of the copper mineral samples from the site fall in the area where the isotopic values for these three sources overlap. The overlap exhibited by these sources is likely the result of the similarity in geologic age for these three ophiolitic metalogenic zones.

iii) One of the seven copper mineral samples from Harappa *may be* isotopically analogous to the slag samples from northern Rajasthan, specifically those from Ganeshwar. "Based on these seven archaeological copper mineral samples from Harappa, the following conclusions may be drawn. It is unlikely that either Ambaji (Gujarat) or the central Himalayan sources were supplying Harappa with copper minerals. Harappa may have procured a small portion of its copper minerals from sources in northern Rajasthan. However, at present, the data indicates that the majority of Harappa's copper minerals were obtained from sources to the west or south of the site".

iv) "If mineral procurement parallels copper ingot procurement, sources to the west or south likely supplied the majority of Harappa's needs".

Lead isotope analysis has also been conducted on 12 copper or copper alloy artifacts from Harappa. Examples of beads, bangles, rods, and sheets were analyzed. All artifacts were from the Mature Harappan phase and from mounds E, ET, or F. This analysis was conducted at the University of Michigan Department of Geosciences on a Thermal Ionization Mass Spectrometer (TIMS). The results strongly indicated the presence of 3 possible groups, or source areas, with perhaps two of the groups indicative of closely geologically related source areas. Comparing the results from the analysis of the archaeological mineral samples to the artifacts allows some preliminary conclusions to be drawn: "The first is that the same broad pattern seen in the archaeological minerals—that of being primarily related to copper ore sources west or south of Harappa—is also evident in the data from the artifacts. Further, just as in the minerals, there is a potential isotopic correlation with slag samples from northern Rajasthan. However, this connection does appear to be very weak, based on the data presently available".

" The results from the beginning stages of analysis of the copper assemblage from Harappa indicate that during the Harappan phase, the city was obtaining copper raw material primarily from sources to the west or south of the site in Oman, Baluchistan, and Waziristan. The artifacts from Harappa also demonstrate this pattern. While there is some evidence for the possible utilization of copper from northern Rajasthan at Harappa, it is neither firm nor indicative of a high degree of use, contrary to previous hypotheses regarding the source of Indus period copper" (3).

Copper Alloys: Copper alloys are metals that have copper as their principal component. They have certain properties that are superior to pure copper. When mixed with a small amount of arsenic, tin, and some other metals, inadvertently through the selection of the raw ore, or deliberately as the art of alloying developed with time, it becomes hard and does not corrode as easily. Most importantly, the alloy has a lower melting point than pure copper, which allows easier melting and casting. Pure copper has a reddish gold color which quickly oxides to a dull green. Alloying with other metals significantly changes its color which may be desirable for certain uses, such as ornaments. The best

known traditional types are bronze where tin or arsenic is a significant addition, and brass, using zinc instead. While the Harappan Civilization is known for its bronzes, zinc was not known in the Indus Valley.

Almost all copper ores contain small proportions of arsenic, tin, zinc, lead, antimony, or nickel, which mixes at the molecular level with copper during smelting. In other words, a tremendous number of subtly different alloys can emerge out of a smelter, depending on the composition of the ore. Paradoxically, the less pure copper ore that was available, the greater the variety of alloy the smith would obtain from his smelter. These alloys were still dominated by copper, but the metal exhibited improvement in several properties.

It appears that initially, the ancient smiths could select relatively pure ores for smelting, recognizable by their dramatic blue and green colors. But as demand arose and the first early ore discoveries were worked out, they mined deeper and began to reach copper ores that were less pure. The copper that began to come from the smelters now had relatively more impurities in it and the smiths were inadvertently smelting batches of metal that were not pure copper but alloys with other metals. We see this trend in archaeological records wherever such data are available. As the technology improved, the Harappan smiths deliberately began to add ‘impurities’ to the mix in order to achieve the desired characteristics in the metal.

Bronze is any alloy that is 85-95% copper, with the other 5-15% made up of mainly of tin or arsenic, though other metals can be present in small amounts. A low amount of tin or arsenic does not improve the copper enough, and a higher amount makes the alloy so brittle that it becomes useless. Tin bronze is not too difficult to work, and melts at 950 degrees centigrade rather than the 1084 degrees for copper, making it easier to cast. Both bronzes make strong hard tools and weapons that retain an edge as well or better than stone, once they are strengthened by hammering. This definition of a copper alloy may, however, not hold for the recovered Harappan metal objects, there a much wider spectrum of the alloy composition is encountered. This has generated a lively discussion among archaeologists as to what should be considered as an alloy and what should be a copper object with some impurities.

Differentresearchershaveuseddifferent standards to define alloying. Agrawal (12) states that more than 1% arsenic or tin constitutes intentional alloying. However, Sana Ullah (1931) defined an intentional alloy as containing from 2 to 4.5% arsenic or 4.5 to 13% tin. Some scholars favor the value of 5% tin to qualify as an intentional tin bronze used for functional purposes. This functional criterion ignores the changes in color that occur with the addition of less than 5% tin; the ability to resist oxidation may have been more important than hardness or strength for the early metalsmiths and consumers (17). Harappan copper alloys are especially difficult to define at present, given the lack of information on copper ore composition and processing technology. Here we will follow Agrawal in defining metal objects with 1% or more tin or arsenic as being alloyed. In the lower percentages, however, it is not possible to determine if the tin or arsenic alloy is the result of intentional manufacture or simply a result of the natural ore compositions. Some scholars suggest that regardless of the arsenic content, arsenical copper was derived primarily from arsenical copper ores (18).

Morphologicallysimilarobjectsfoundat Harappan sites are made from relatively pure copper, arsenical copper, and tin bronze. Possible patterns of alloying are obscured by the lack of a large

sample, the absence of any sampling methodology, and the inconsistent manner in which samples from different sites have been studied. It should be noted that most of the objects analyzed were excavated before the introduction of stratigraphic controls, and the variations may have some chronological significance. Another obvious factor contributing to the apparent lack of consistency in alloying is the remelting of a mixture of metal objects. The recycling of copper/bronze objects is indicated by the numerous caches of broken tools and metal scraps recovered from all of the major sites. At this point it appears that Indus metalsmiths did not follow a rigid system of alloying related to specific artifact categories. Furthermore, the lack of patterning seems to be the norm during this period throughout West and South Asia. For example Pigott et al. (18) note that no apparent correlations exist between artifact categories and elemental compositions during any period at Tepe Hissar. Given these problems, it is preferable to discuss the use of copper and copper alloys as a single group, rather than create artificial divisions based on elemental composition.

We may be unable to define patterns of alloying because the Indus metalsmiths used alloying for a variety of purposes - functional, aesthetic, ritual, and/or simply expedient. For example, the addition of tin to copper may have been done to increase strength and hardness for some objects, but may have been used to produce particular colors or fulfill ritual requirements in other objects. Or a mixture of alloyed scrap metals may have been the material available for a smith's selection - expediency is diffcult to model archaeologically, but too common ethnographically to ignore. For instance, Lahiri (19) discussed a variety of reasons for alloying in modern and historic South Asia. This multiplicity of choice is hinted at by the types of finished objects with high tin contents from Harappan Phase sites. Two categories of objects are high in tin: tools or weapons such as chisels, daggers, and some "celts"; and ornaments such as bangles. When faced with the choice of desired characteristics, including hardness, color, shape, etc., the Indus metalsmiths may have chosen between a number of alternative means of producing a given result. In some instances they may have relied on physical modifications such as forging to harden metal, while in other situations they may have chosen to produce a harder metal by modifying the composition of the metal through alloying. These choices would depend in part on the manufacturing techniques used, and on the stage of metal production (smelting, melting, casting of blanks, etc.) at which the end product was first visualized.

While there is no distinct pattern of alloying relating to specific artifact categories, there does seem to be a pattern in metallurgical traditions on a regional scale. This is evident as we examine the Arsenical Copper and Tin Bronze articles, discussed below. These regional patterns are most evident in the varying amount of arsenic in copper metal objects from different parts of the greater Indus region. These compositional differences probably result from the use of more than one copper source by the Indus peoples, rather than from different traditions of alloy use. A large art of this compositional difference also comes from the source of

J World Prehist (2009) 22:237–264the ore employed for smelting.

Fig. 2

Generalized diagram of copper production

It has been stated before that only a small number of actual mineral fragments have been re

ported from Harappan sites. At the site of Mohenjo

of these minerals were not found in association with metal processing debris, it is more

daro, "a quantity of copper ore" was found in a pit in

DK

area,

as
Mackay
reported
in
purposes—as cosmetics, medicines, poisons, Harappa, “small fragments of chrysocolla and chal
Harappans most likely derived their ore.1938, and atlikely that most of them were imported not for metal production or alloying, but for other There is now a universal agreement that the or pigments. An interesting contextual
exception is a fragment of lo¨llingite found at Harappa that was the only non-copper object initial creation of a copper-arsenic, copper
copyrite have been recovered”, as Dales and Ke antimony, and copper-arsenic-lead alloy was, most
in a copper vessel containing a ‘horde’ of more than 90 copper/alloy objects and scrap
noyer reported in 1990. One of the earliest sourcing probably, a consequence of smelting arsenic or an (Vats 1940, pp. 90), which
is a suggestive point of evidence for deliberate arsenical timony rich copper ores. However, the subsequentalloying encouraging testing of this possibility.Desch in 1938.
Later studies include that of Agrawal (12) and Chak widespread appearance of these alloys suggests Furthermore, smelting of metal ore usually results in fairly conspicuous accumulations
rabarti (1). Agrawal (20) suggested that Indus peo that deliberate choices were also being made in the
of manufacturing debris and broken firing structures, especially the weather-resistant vitproduction process, whether in the selection of ores ples used native copper oxide as well as sulfide
rified masses of silica and other fused minerals that generally accumulate in conspicuousor the mixing of metals. Copper-tin alloys are of
ores, at least for the copper objects at Harappa and

mounds near the smelting furnaces. On the basis of quantity and type of slag, the small amounts of copper metal slag found at Indus civilization sites seem to be more repre 402
sentative of melting than of smelting (Miller 1994, 1999). Metal ingots must therefore have been imported into the Indus region, and a number of copper ingots have been found at

several sites, as well as a possible lead ingot at Mohenjo-daro (detailed in Kenoyer and

Mohenjo-daro. Depending on how one defines alloys, tin bronzes are the second largest category and arsenical coppers the third. Out of the 129 copper metal objects that Kenoyer and Miller (2) have tabulated, 36 objects have 1% or more tin, 20 objects have approximately 1%or more arsenic, and 6 of these objects have 1% or more of both tin and arsenic It should be emphasized that the analyses of these objects by different scholars are not always comparable, but in general terms the numbers can be useful.

Archaeological evidence shows that the early bronzes in west Asia were copper alloys with arsenic, the latter being integral part of the ore that was

available to the region. Arsenic alloys of copper were known at Ur in Mesopotamia around 2600 BC and earlier at Tepe Gawra VIII in northern Mesopotamia; in Egypt, especially during Dynasty IV times (2600 BC); and at Susa. Arsenic alloying, however, gave way to tin alloys towards the second half of the third millennium BC. Just like Mesopotamia, the early examples of copper artifacts in the Greater Indus Valley contain arsenic (and lead), rather than tin. It is not clear if the Indus people deliberately alloyed arsenic with copper or the former only represented the natural impurity of the ore. Many early copper objects are made with more than 5% arsenic. The presumed use of these

objects would indicate that they were not made with the properties of bronze in mind; there seems no correlation between the application of the object and the arsenic content of the metal. Tools were made with low-arsenic copper and ornaments were made with higharsenic copper. Probably arsenical copper was used only because arsenic ores were more common in nature within the Harappan source area than tin ores. Neither does it appear that they alloyed lead with copper since here too the percentages of lead in the alloys is more or less at the level of natural composition of copper ores

of the western region. We don't know accurately how often arsenate ores occur in copper deposits in Chagai region or in Las Bela from where the later origin. The majority of tin ore sources throughout Eurasia are concentrated in a narrow geological belt stretching from Europe to Southeast Asia, making them not only relatively scarce, but perhaps also facilitating the adoption of bronze throughout the Eurasian landmass via the steppes of central Asia. Recent research has also demonstrated that tinbronze may have been made from rare copper and tin bearing ores such as satiety or its oxidic weathering products, which are found in at least one location in western Iran, within the tin belt in Central asia. Whether these ores led to the earliest manifestation of tin-bronze production in those regions has yet to be resolved.

It appears that during the later half of the third millennium, when Mesopotamia and Iran were switching from arsenic to tin for fashioning their copper alloys, similar transition was taking place in the Greater Indus Valley and Afghanistan. Since chronological data as to the predominant composition of copper alloys is not available, the sequence of development is hard to speculate. The available data, however, indicates that such a technological transition was deliberate rather than driven by the availability of particular copper ores. One reason may have been that arsenic is valuable in making the metal appreciably harder only when objects are cold hammered and not when cast. Another drawback of arsenic would be the toxicity of its fumes. Tin bronze is easier to cast, and gives tools with harder working edges. Comparing tin- and arsenicalloys, one finds that the two are not comparable in strength no matter what the alloy content: tin bronze is the harder metal. Even a 3-4 per cent tin bronze offers a significant advantage.

Unlike lead and even arsenic, there are no known tin objects or tin minerals from Mature Harappan sites. Tin bronzes were definitely used by the Indus peoples, however. If tin was being added as a separate metal to form copper alloys, it was carefully conserved and has not yet been discovered in the archaeological record. However, it is also possible that previously alloyed tin bronze ingots and scrap were traded to Indus peoples, rather than tin being traded as a separate metal.

From the large site of Mohenjo-daro only 24 analy- ses of copper metal objects have been published, and of these, 12 objects have more than 1% tin (2). At Harappa 9 out of 29 copper metal objects analyzed contain more than 1% tin. At Lothal, 71 out of the total of 1500 objects recovered were analyzed; this is a relatively large sample for an Indus site. Of the 64 copper metal objects published, few are alloyed with tin, and only 8 have more than 1% tin. As discussed earlier, tin bronzes from Lothal and Rangpur also contain little or no arseni. This has an important implication: these tin bronzes were being made locally, or imported from sources that were different from those supplying Harappa and Mohenjo-daro.

Tin sources are rare in India and unknown in Pakistan. The possible sources include Khorasan (southern Afghanistan), Kara Dagh region of northwestern Iran, Luristan and Khuzistan in southwest Afghanistan, and the area between Bukhara and Samakand in Central Asia, in addition to Badakhshan

(northern Afghanistan). As far as present evidence goes, especially that more directly relevant for us, tin was to be found in eastern Afghanistan from Badakhshan, southward around Kandahar; and in western Afghanistan near Herat. Since these regions were very familiar to the Indus peoples, it is not surprising if the Harappan merchants thoroughly exploited these resources. The better possibility is, however, that the Harappan looked for tin ore in their own vicinity. Cassiterite, the dominant tin ore, is tin oxide. It occurs as distinctive black grains in alluvial sands, and in some areas it is left behind as a resistant mineral after granite has weathered down to sand and clay. These sandy deposits often occur around old granite beIts in Baluchistan, especially around Chagai region. It is possible that its properties were examined closely by potters, and since cassiterite melts at only 600 degrees centigrade, it would be noticed, and perhaps accidentally smelted to tin. Thus, in view of these recent discoveries, the Harappans could have collected the tin ore where they collected the copper ore itself.

In the Indus Valley, bronze comes in evidence from the lowest levels at Mohenjodaro, although it is noticeably more common in the upper levels. Four main varieties of metal were present: crude copper lumps, in the state in which they left the smelting furnace, with a considerable quantity of sulphur; refined copper containing trace elements of arsenic and antimony, doubtless deriving from the original ore; an alloy of copper and arsenic having from 2 to 5 per cent of the latter substance, probably present as a natural constituent of the ore; and bronze, having a tin alloy content in the range of 1.1 to 1.3 percent but occasionally rising as high as 8 to 12 percent.

There is an active discussion in the academic circles if the Harappan knew the art of alloying or if the bronzes found at the Harappan sites represent only a chance composition of ores which some particular groups of artisans made use of at a certain place and time. There are some archaeologists, such as Agrawal, who insist that the process of alloying was well understood and that the differential ratio of copper to other alloying metals reflected functional variations. In other words, tool types whose utilitarian function would have benefited from hardness would have the higher amounts of metal additives needed to produce that hardness, and tool types whose utilitarian function was not so dependent upon hardness had smaller amounts of metal additives. In his studies, Agrawal found that tinbronze was mainly confined to knives, axes and chisels, with other objects having a lower percentage of metal additives. About 30 percent of bronze artifacts from Mohenjo-daro and Harappa have tin ranging from 8 to 12 percent. This, according to him, indicates that the Indus people deliberately alloyed copper with tin in order to obtain bronze. He is of the opinion that the high tin contents of tinbronze used for tools such as chisels and axes reflected a technological decision rather than a cultural tradition, in the same way that tools whose utilitarian function was not dependent upon hardness but on sharpness (i.e., points, razors, fishhooks, etc.) would need lesser percentage of tin (12, 20).

Other researcher find this use-specific evidence on alloy composition singularly missing. According to these opinions, a generalization such as made by Agarwal is unwarranted because very few Harappan bronze objects have been subjected to compositional analysis. The initial studies suggest that the Indus metalsmiths did not maintain a uniform standard for alloying and that the Harappans did not practice the art of deliberate alloying of copper with other metals. They point out that 70 percent of analyzed copper artifacts from Mohenjodaro and Harappa have been found to contain only 1 percent tin, almost the same as found in some natural ores. Coupled with this observation one is reminded of the fact that among the limited compositional analyses available so far, some artifacts represent alloy compositions which are completely inappropriate for that use or for that particular application. The bronze objects at Harappa and Mohenjo-daro do not fall into neat categories of

hardness, sharpness, ease of casting, etc, in relation to their application, and the data from Agarwal fail to show this relationship.

Smeltin or Melting? An issue that has been debated quite vigorously in recent years is whether the Hardpans smelted their ore at their occupation sites, or whether they brought in their copper in the form of raw ingots from sites close to the sources of the ore for melting and allying. This topic has been adequately discussed in the last chapter and need not be repeated here but for an essential outline.

Overall, the Indus metalsmiths appear to have been familiar with the techniques used to process the major metals and alloys, except iron and brass.The major indicators for metal processing at a site include: (i) fragments of ores; (ii) kilns, or fragments of kilns, attributed to metal processing; (iii) metallurgical slag, from the reduction of ore to metal; (iv) tools used for metal processing, such as crucible fragments with metal prills, molds, anvils, stakes, hammers, chisels, etc.; and (v) metal objects, including smelting and melting ingots, semifinished and finished objects (2). Significant amounts of ores and/or metallurgical slag fragments are the most convincing evidence for smelting at a site. A variety of clay-based non-metallurgical slags, including fragments of kilns and crucibles, can represent either the smelting of ores or the melting of metal, depending on the exact nature of these indicators. Metalworking tools (other than crucibles with prills or molds) are usually difficult to attribute directly to metal processing, except when found in well-documented contexts in association with a number of other metalworking indicators. Metal objects, including metal ingots, must also be from such contexts to show their production at a site, as these objects may have been imported from other sites.

The paucity of metal ores from Indus sites was noted above; there is a similar lack of metallurgical slags. Smelting of ore usually results in fairly conspicuous accumulations of manufacturing debris and broken furnaces. In particular, the smelting of most ores results in the production of weatherresistant metallurgical slags, vitrified masses of silica, and other fused minerals, which generally accumulate in conspicuous mounds near the smelting furnaces. On the basis of quantity and type of slag, the small amounts of copper metal slag found at early Indus sites seem to be more representative of melting rather than smelting (2).

On the basis of this evidence (or a lack of one) Kenoyer and Miller, who have done quite extensive research in Harappan metallurgy, have come to the conclusion that the Harappan acquired their metal from other sites. “In view of the present evidence, we must concur with Sana Ullah's and Mackay's earlier interpretations that most of the copper used at the Harappan sites was imported in ingot form, and little or no smelting was done at the major sites of the Indus Valley” (2). Plano-convex disc-shaped copper ingots have been recovered from Chanhu-daro, Lothal, Harappa, and Mohenjodaro. The shape of these ingots reveals the fact that they were produced in open pit furnaces or large crucibles. Many of the ingots recently rediscovered in the reserve collection at Harappa and Mohenjodaro have been found smashed and broken in half or smaller wedge shaped fragments, apparently to facilitate further processing. This strengthens the above-quoted proposition of Kenoyer and Miller. The jury is, however, still out on this point.

The practice of smelting by the Harappans for the acquisition of metal cannot, however, simply be thrown out of hand. The smelting of lead was known in the Jhalawan area of Baluchistan during the Amri-Nal phase, around 3500 BC, and it is possible that during this time the Indus artisans could have discovered the art of copper smelting as well. This is evident by the increasing frequency of findings

of copper artifacts at Mehrgarh and in southern Baluchistan.The absence of slag heaps and smelting debris at Harappan sites may be due to the fact that most excavated sites, particularly of the Mature Harappan Phase, are located some distance from the primary sources of metal ores.

The melting of original smelting ingots to produce secondary or refined ingots is a common intermediary stage between the production of the original smelting ingot and the final fabricated or cast object. This secondary ingot production is undertaken for one or more reasons: to remove slags or other undesired elements left in the original smelting ingots; to break up large smelting ingots into more workable or transportable ingots; to melt down metal scrap; and/or to form metal alloys. The production of alloys can take place at any one of several stages during the production process. Sana Ullah in Masrshall's original reports remarked in the very first published analysis of Harappan ingots (his "copper lumps"), that three of the four ingots were the "crude product of the smelting furnace" which were too rich in sulfur to be forged. He suggested that such ingots would be remelted for refining; otherwise this metal could only be used for casting "heavy or plain objects."

Casting and Fabrication: Production techniques for metal objects can be classified depending on the state of the metal during working. Casting refers to the manipulation of molten metal, while fabrication is the treatment of non-molten metal, whether cold or hot. A brief description of casting and fabrication has been given in the last chapter: abrication involves the direct shaping of metal, while casting begins with the shaping of other materials into which the molten metal is poured. The tools and techniques of the two categories overlap to some degree, and ancient metalworking ateliers may have been involved in both fabrication and casting.

All of the evidence to date for both casting and fabrication techniques has come from the examination of finished objects. Casting of copper objects appears to include both open face and bivalve casting, as well as lost wax techniques. Mille et al. (21) discuss early casting methods at the Baluchistan sites of Mehrgarh and Shahi Tump; the latter case might be more related to eastern Iranian traditions than Indus traditions. Fabrication techniques include shaping by forging to manufacture both sheets and vessels, cutting, cold and hot joining, and finishing methods such as polishing, engraving and inlay. The preserved Indus corpus of copper and copper alloy objects appears to be wellmade with a good standard of workmanship, but fabrication and casting techniques do not appear to be particularly complex or intricate, in contrast to contemporaneous metal traditions in eastern Iran or Central Asia for example (5). Although re-melting for scrap was common, as indicated by both finds of hordes and (possibly) patterns of artifact composition, there is every reason to think that the work preserved is representative of the overall production abilities.

Uses and Applications: Although the use of several metals were known to the Hardpans, it is the copper and its alloys for which the Harappan Civilization is better known. While the bulk of tools and implements were still made of stone, tools made of copper now began to play a key role, not only because they could withstand high pressure without breaking, but also because they could help cut stone tools. Similarly, some articles of daily use began to be made of copper instead of stone or pottery. A standard range of tools made of copper and bronze is recorded at site after site. Many among them set the pattern for later tool types for centuries and millennia to come, and the majority exhibit a simplicity of design and manufacture, linked with adequate but not great functional efficiency. The greatest use of copper was, however, in fashioning of ornaments.

There is an array of copper objects distributed over a large area. These are the objects of common

use as well as exotic artifacts, such as copper mirrors with sculptured handle representing a female figure: the head is provided by the reflection of the mirror's user. The Early Harappan sites (ca. 3500-2800 BC) in southern Baluchistan and the settlements of the Kulli culture are particularly rich in copper and bronze objects and some of these traditions continued into the Mature Harappan phase. Most of the artifacts appear utilitarian. Except for two specimens of dancing girls, no human images are available in metal. Animal figurines of dog, swan, elephant and bull were also cast in miniature in copper. This array of copper artifacts shows that the Indus metalsmiths of the period were well-acquainted with copper-bronze metallurgy. In the following we touch upon a few copper artifacts that have been found in the urban context of the Harappan Civilization.

In order to better understand the role of metal objects in Indus society we need to have detailed information on the contexts in which metal objects have been found. The vast majority of metal objects available for study come from the earlier excavations and we have little information on the stratigraphic or chronological context of the artifacts within each site. Nevertheless, some generalizations can be made on the basis of the current evidence.

As noted in the last chapter, the earliest use of metals by Indus peoples is for ornaments or amulets and not for functional tools. During the preurban period at sites such as Mehrgarh, Nausharo, Balakot, Jalilpur, Rehman Dheri, etc., we see an increase in the use of copper to make tools as well as ornaments. These copper/bronze tools are used in conjunction with the stone or bone tools and supplement rather than replace them. There is evidence for the introduction of new forms of copper/ bronze tools that anticipate the major surge in metal tool production during the subsequent Harappan Phase. During the Harappan Phase, some types of tools that had previously been made of stone do become totally replaced by metal tools (22). The most important include the barbed arrowheads, spearheads, axes, adzes, hoes, chisels, and large blade tools. Copper fishhooks may be a new type of tool, as so far no hooks have been identified in bone or shell, or they may replace earlier hooks made of bamboo or some other perishable material. Interestingly enough, however, there are still some tool categories where non-metal materials are supplemented rather than replaced by metal versions. These tool categories include stone drills used for perforating a variety of materials, stone blade engraving tools (burins and engravers), various denticulated gold and silver ornaments found in nonhoard contexts are usually tiny beads or gold foil fragments that were probably lost in the muddy streets or courtyards.

Many of the metal vessel forms are similar to terra-cotta prototypes, with the "cooking pot" being a predominant form. Yule (6) notes that of the examples available for his study, "about one half of the types/forms exist in pottery, but many are peculiar to metal." It is not clear how many of the unique shapes in metal are due to the variations that result from the techniques of manufacturing metal, rather than the desire to make new forms. However, the distinctive long-handled pan is a definite example of a new form, as even short handles are almost unknown for Indus ceramics.

Finally, some uses of metal which might be expected do not occur. The primary example is the continuing use of chert blades to make sickles during the Harappan Phase; only one possible metal sickle (or dagger) has been found, a curved copper blade from Mohenjo-daro. Even if other more convincing examples of copper sickles do turn up, it is clear that this type of tool was made predominantly by hafting stone blades. A distinctive type of denticulated sickle blade continues to be used in the Late Harappan period at Pirak. Many scholars specifically focusing on the replacement of some stone tools by metal have concluded that the role of metal (i.e., copper/bronze) during the

Harappan Phase was primarily utilitarian. However, this conclusion is based on the distribution of *all* metal objects at Harappan Phase sites; ornaments and tools are not separated (2).

Kitchen Utensils: Whereas most Indus people used terracotta vessels, some copper or bronze containers have been recovered, often buried with bronze tools and weapons or jewelry hoards. Metal containers were, of course, much durable than terracotta and may have been passed on from one generation to the next as objects of wealth, but because they could be recycled into other objects, relatively few have been recovered. Many copper/ bronze containers were probably melted down to make ornaments or tools: this pattern of recycling could explain the rarity of vessels made of more precious metals such as gold and silver.

Pans, pots, and bowls of copper and bronze occur in the earliest excavated levels at Mohenjodaro, designated by Marshall as Period I; the copper-tin bronze pots and bowls have an almost exact counterpart in pottery. A few pans with handles are found at Mohenjo-daro and at Chanhudaro. The handles of these pans were formed by bending metal over or under in tubular form, an art known from at least the time of Mundigak Period IV.

Copper and bronze vessels, which would have been used only by the most wealthy and powerful classes, were usually made in the same style as terracotta vessels, except where the differences in raw material made it impractical. For example, wide plates of bronze usually had vertical sides with simple rims, rather than the bilaterally projecting rim found on terracotta plates. The splendid copper and bronze vessels which are among the outstanding examples of the Harappan metal-workers' craft were either raised or sunken by hammering over a form.

The copper and bronze vessels which are among the outstanding examples of Harappan metal works, were either raised or sunken by hammering over a form (see Chapter 17). In the later part of the Harappan period an additional technique, that of lapping or joining two parts to make a composite jar, appears. A highly sophisticated development in Indus metallurgy can be seen in the joining of two parts of a bowl or jar by lapping. It is most probable that bowls with sharply carinated shoulders were made in two portions by raising and then joined by lapping. There have been no reported instances of copper soldering in the Indus Valley, although the knowledge of this technique is seen in the gold and silver work.

Tools: Another functional category of Indus copper and bronze forms are those objects that were used as tools. Here a tool is taken to be any object that is used to accomplish a mechanical or manual task. Indus tools take a variety of forms. These forms can be grouped into three broad subcategories; blade tools, rod tools, and axes/adzes (2). In turn, each of these sub-categories of tools may contain specific types. Blade tools are manufactured from sheet copper and distinguishable types include triangular barbed arrowheads, saws, knives, spears, and razors. Blade tool types are morphologically distinctive and further research is needed to determine if additional types and subtypes can be defined. However, all of these tools would have been used as blades; that is, to cut some material. Rod tools are those manufactured by casting and include two distinct types; chisels and pointed tools. Chisels are rectilinear rods with wedge shaped working ends. Pointed tools are also rods, but can range in cross section from rectilinear to round and have a variety of working ends. At present this type comprises a variety of morphologically similar objects that may have been used for a range of purposes and tasks. Hooks are another category of rod tools. It is inferred from their shape that these tools would have been used for fishing. A final category of Indus copper and bronze tool forms is axes and adzes. All

of the objects in the axe/adze category are morphologically similar and would have been used in comparable ways. They are easily differentiated from blade tools even in fragmentary form, since they are not made from sheets and are considerably more massive.

The most common metal tool found at Mohenjodaro and Chanhudaro is the chisel. This, due possibly to coincidence, is not so at most of the other Indus sites, where the flat axe is the most common metal tool. The chisel typically acts as a sharp-edge tool for cutting or shaping wood, stone, or metal. Since metal does not appear to have been cut and shaped by chisels in sufficient quantity to cause such a demand and subsequent supply, we are left to conclude that these chisels were used for the shaping and cutting of wood, which has not survived.

The tool repertoire of the Harappans shows a lack of warlike weapons. The types are simple. Neither the complicated moldings of Mesopotamia nor the ornate designs of Chinese metalwork were ever attained by the Harappan smiths. It may be pointed out that needles with eyes on the pointed ends, true saws, circular saws and drills are Harappan contributions to the world of instruments.

Blade-axes of a simple form are common, and basically of two different types: long and narrow and short and broad. Both types have double shaped lunate edges, slightly sloping sides, and square-cut butts. The short and broad ones seem to be more common outside of the Indus Valley core. The blades are technologically almost identical: none have midrib, and all have a short, flat tang. The only significant variation lies in the curve of the shoulders and cutting edge, yielding blades varying from leaf shapes to narrow, angular shapes; it is unclear whether this reflects deliberate imposition of form or the effects of re-shaping. This is in apparent contrast to the Near East where axes took on a large number of forms. The exact function of Harappan blades is uncertain, but they closely match types of daggers from the Levant and the Near East.

Shaft-holed axes are rather a rarity and must depict imports. Unsocketed axes are common but whether these are weapons or tools is a still a moot question. The quadrangular axes were certainly capable of cutting the local trees and from their comparative commonness appear to have been widely used. Unsocketed Harappan axes are seen to be technologically inferior to their socketed Mesopotamian counterparts. However, unsocketed axes evidently were used in contexts of working of wood in Mesopotamia alongside more complex socketed designs. Thus, the absence of a socketed axes does not necessarily mean a weakness in Harappan technology. A shaft-hole bronze axe head was found in the upper levels at Mohenjo-daro but is not a typical Indus tool. A similar axe-adze was found at Chanhudaro and dated ca. 1200-1500 BC or five hundred years later than its identical counterpart at Mohenjo-daro. Such axes are known from sites as Hissar (III) in north-eastern Iran and are presumably derived from Central Asia or the Caucasus. The axe-adzes at Chanhu-daro and Mohenjo-daro have been assigned to the Jhukar Culture. If this designation is correct, then the lower date of 1500 BC is more acceptable for them than the higher date of 2000 BC.

Many scholars have commented unfavorably on the technological simplicity of Indus metal tools, pointing out that their saw was nothing but a bunch of shallow notches along a dull metal edge and the copper axe remained flat and unsocketed despite the presence of the socketed axe in neighboring Afghanistan. They point to the fact that in its Mature Indus levels Mohenjo-daro has yielded a possible pottery model of a socketed axe, but no real sample of it has been found in copper anywhere among the Indus cities. This is rather surprising and no satisfactory explanation is available. However, a close look at Indus metallurgy would make it clear that the production of such simple artifacts could

not be the consequence of lack of technical knowledge and experience. There must be some other factors at play.

Unsocketed Harappan axes are seen to be technologically inferior to their socketed Mesopotamian counterparts (23). However, unsocketed axes were evidently used in military contexts in Mesopotamia alongside more complex designs. Postgate (24) observes that the Stele of Vultures, erected by Eanatum of Lagas around 2800 BC, depicts soldiers armed with solid axes, although the identification of these axes as unsocketed is not certain. In the 'A' cemetery at Kish (Early Dynastic period), solid axes are placed in the same locations, with respect to the body, as socketed axes, suggesting the two designs were understood as performing the same functions. In Egypt, battle-axes remained unsocketed until the Iron Age, and were fastened to the shaft by cords or tangs. Technologically, these Egyptian examples are no more advanced than the flat axes of the Indus Civilization. Clearly, flat axes were used as weapons in Egypt and Mesopotamia during the Third Millennium, leaving no reason to suppose that those from the Indus were not.

The presence of a unique metal saw at Harappa and, indeed, the constant presence of saws at other Harappan sites suggest a great dependence on this tool. In the early metal saws, excepting the Mohenjo-daro example, the teeth do not appear to have any distinct direction; the saw was simply an abrading instrument for scarping out a grove by pulling and pushing. The saw from Mohenjo-daro, on the other hand, has its teeth edge undulated in order to prevent binding in a cut. This is the first evidence for the use of the copper/bronze chopping or cutting tools from the Harappan Civilization. The blades are hafted on bone handles.

A true cutting saw, which, except for this example, does not occur prior to the European Iron Age. Its presence suggests that the Harappans had developed a dependency on and need for cut wood. The great number of chisels tends also to support this theory. The wooden beam rafters in the large architectural structures, as well as the wood needed for fuel to fire their metal– and brick-producing kilns, were doubtlessly cut with such saws. Fishhooks hammered round in section are common on all Harappan sites. They are, for the most part, of copper with a simple end barb and punched eye at the end of the shank to secure the line. There are, however, some examples which look as modern as they can be. Razors of the Indus Civilization take a

does not necessarily mean a weakness in Harappan technology.
A shaft-hole bronze axe head was found in the upper levels at Mohenjodaro but is not a typical Indus tool. A similar axe-adze was found at Chanhudaro and dated c. 1200-1500 BC or five hundred years later than its identical variety of forms. The most common type has oppo site blades of dissimilar shapes at the end of a long

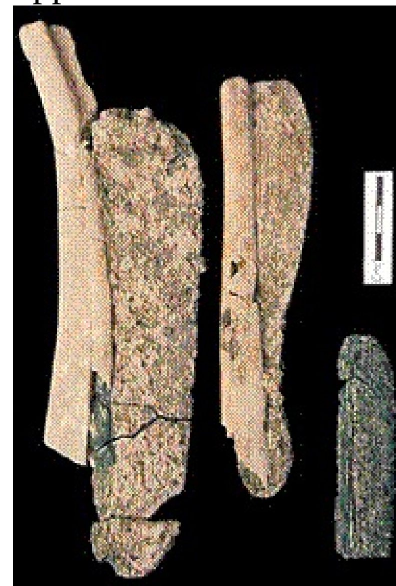
rodlike handle. known from sites as Hissar (III) in north eastern Iran and are presumably derived from
Weapons and Tools: The weapons inventory Central Asia or the Caucasus. The axe-adzes at

of the Harappans is not very formidable and only a very limited number of objects can be ascribed a purely military

designation is correct, then the lower date of
function: a leaf-shaped flat-sided
1500 BC is more acceptable for them than the
higher date of 2000 BC. lance or spear (an example of a ribbed lance head

further commented upon by Lal. Technological simplicity was earlier noted by Marshall and Piggott also. The gist of all these discussions is that the Harappan society was essentially free of armed conflicts. Edward Clark (25), however, takes issue with these researchers on the ground that none of these statements has been tested, or given critical consideration. In particular, the almost verbatim

was found by Mackay in the
The presence of a unique metal saw at Harappa some barbed arrowand, indeed, the constant presence of saws at
points, and daggers are the known metal weapons.
upper levels at



repetition of Mackay's original comment regarding

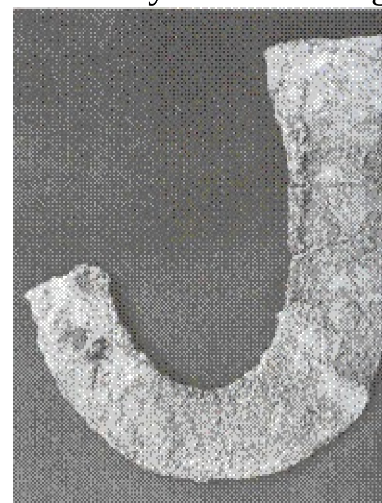
Mohenjo-daro), axe heads, the thinness of blades suggests that it has simply become received wisdom.
Two copper swords, thickened toward the middle in Two copper/bronze chopping or cutting Some scholars have suggested that the use
saws, excepting the Mohenjodaro example, the tools from Harappa. The blades are of tin bronze was restricted to tools, jewelry and teeth do not appear to have any distinct section but without a true midrib, were found athafted on bone handles.

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production

true cutting saw, which, except for this example, does
decoration.
suggests arrowheads the

Spears and
Harappans developed

unimportance of weapons in the Harappan CivilizaThe second type is L-shaped; the third has a handle that bends backward parallel with with pointednot occur prior to the European Iron Age. Its presence tion and strengthens the argument for the nonviothe blade. A rarer type consists of a long, thin, straight blade with a round edge at one
end. They seem to be agricultural implements.


A curved razor blade made of copper or its alloy. It seems to be
A curved razor blade an agricultural implement.

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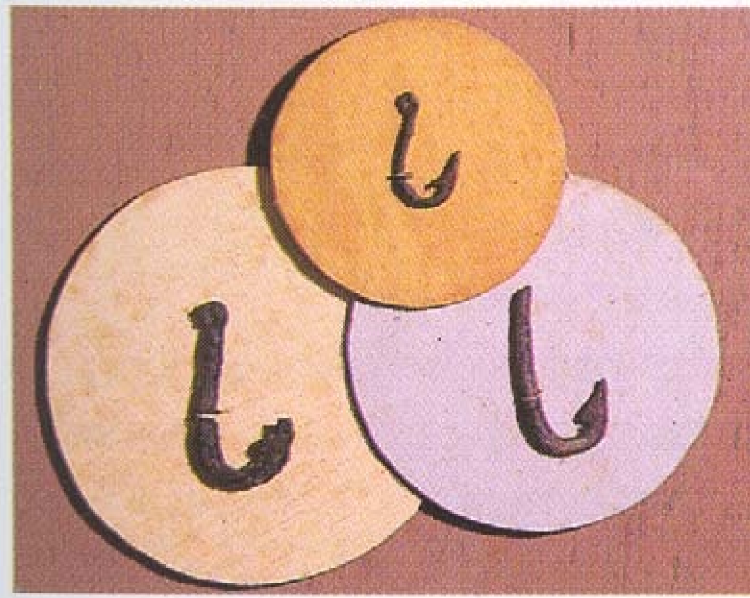
their levelsmetal– atand Mohenjo-daro.kilns, argues and disdoubtlessly cut with such saws. These spear- and arrowcussed in the heads are notable for theFishhooks hammered round in section are common onabove, tin

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buckled under the mostforms. The most common type has opposite blades of
dissimilar shapes at the end of a long rodlike handle. and the majority
moderate pressure. They

appear to have been rein
forced by a wooden midrib
or to have been hafted
of weapons derive from the high-status funerary contexts of the Royal



Copper fishing hooks, found at several **Copper fishing hooks, found at**
Harapppan sites (after Ratnagar)
several Harapppan sites (*Ratnagar*)

Many scholars have commented unfavorably on the technological simplicity metal tools, pointing out that their saw was nothing but a bunch of shallow notches along a dull metal edge and remained flat and unsocketed despite the presence of the socketed neighboring Afghanistan. They point to the fact that in its Mature Mohenjodaro has yielded a possible pottery model of a socketed axe, but no real sample of it has been found in copper anywhere among the Indus cities. This is rather surprising and no satisfactory explanation is available. However, a close look at Indus metallurgy would make it clear that the

production of such simple artifacts could not be the consequence of lack of technical knowledge and experience. There must be some other factors at play. onto a split wooden
shaft acting as a
midrib. Daggers
and knives with
mid-ribs and flat
tangs begin to ap

Cemetery at Ur. It has been suggested that tin was,*Utensils:* Whereas most Indus people used terracotta vessels, some copper or bronze

at this time, a highly valuable commodity, associcontainers have been recovered, often buried with bronze tools and weapons or jewelry ated by common geographic origin with lapis andhoards. Metal containers were, of course, much durable than terracotta and may have gold. Thus, the scarcity of weapons made of appro been passed on from one generation to the next as objects of wealth, but because they

could be recycled into other objects, relatively few have been recovered. Many copper/
priate copper alloys is not of any historic conse bronze containers were probably melted down to make ornaments or tools: this pattern quence. of recycling could explain the rarity of vessels made of more precious metals such as

pear in the upper

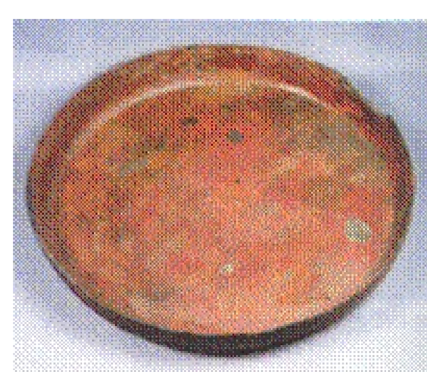
levels of Mohenjo daro. Although they may show foreign influence, they are basically Indus.

Harappanweaponrywas,technologically, relatively simple and unvaried. The bulk of arrows found are swallow-tailed and un-tanged. The blades are technologically almost identical: none have a midrib (although some have slight median thickening), and all have a short, flat tang. The only signifi



cant variation lies in the curve of the shoulders and TheIndus cutting edge, yielding blades varying from leaf

shapes to narrow, angular shapes; it is unclear whether this reflects deliberate imposition of form or



the effects of re-sharpening. This is in apparent weaponry has been

portrayed as a **A few copper implements** technically inade

quate for offensive use, inferior to Mesopotamian. This ineffectiveness and scarcity of weapons was first commented on by Mackay who observed that the blades found at Mohenjo-daro would ‘double up upon impact’, and linked this specifically to an absence of warfare: ‘judging from the small number of weapons of

offensive and defense, the people of Mohenjo-daro neither to have been a warlike people nor have feared invasion'. This statement has been repeated, often word for word, by a host of other researchers. The scarcity of weapons in Harappan context is


contrast to the Near East, where axes took on a Two copper plates; one from Mohenjodaro and one from Harappa

large number of forms including such specialized

types as fenestrated axes, and where blades were Page 386 tanged (voluted and straight), un-tanged, riveted or socketed. Swords only appeared relatively late in the Near East, not becoming common until the Iron Age. There is therefore no reason to suppose that the lack of swords in the Indus Civilization reflects an absence of hand-to-hand combat.

The exact function of Harappan blades is un certain, but they closely match types of daggers from the Levant and the Near East (25). Whilst these are amongst the most technologically basic forms present in catalogues, archaeologists draw attention to the longevity and sheer number of these types of dagger. These ancient Near Eastern blades have a thickness consistent with the Indus examples, but it is not suggested that they were too fragile for practical use, or that they were restricted to domestic (non-violent) uses. In Egypt, metal daggers only became common from the Middle Kingdom onwards (*ca.* 1938 BC) and were of simple design (also technologically similar to Indus designs), with short tangs and rivet holes for fastening the handle (25). Harappan arrowheads have no comparison in Egyptian or Near Eastern metal assemblages, but although they are criticized as being technologically primitive, there is no reason to suppose that they were not effective.

In summary, Harappan axes and blades conform to broad types found throughout the Near East and Egypt. They represent forms that, whilst technologically less developed, are still interpreted as weapons and would have been used alongside more complex designs. Harappan weapons cannot, therefore, be viewed as technologically inferior or inadequate for combat. The effectiveness of Egyptian weapons, despite the slow adoption of more advanced designs, further refutes the suggestion that the technological conservatism seen in Harappan weaponry equates to a lack of warfare. Arguments emphasizing the simplicity of Harappan weapons also ignore the fact that the bulk of complex Mesopotamian weapons (and weapons in general) derive from burial and votive deposits. Items from these deliberately structured deposits clearly do not reflect social reality, and are not comparable with Harappan weapons, which derive *exclusively* from domestic contexts.

Ornaments and Mirrors: Examples of copper jewelry abound at the Harappan sites at almost all levels. Copper beads are common and so are copper bangles. A long spiral copper wire was excavated at Harappa. It was probably worn as necklaces. Spiral- and animal-headed pins are found at Mohenjo-daro and Harappa but they have been included in the post-Harappan Jhukar inventory. Some

jewelers' techniques were fairly advanced even if not as spectacular as, say, in Mesopotamia. In the Harappan repertoire there was the technique of filigree, soldering of gold and silver, tracery on gold, and some granulation (decorating a metal surface with miniature drops of gold, each glued or soldered in place, which is an immensely difficultt technique). For the rest, gold and silver-working was not very different from copper or bronze.

The use of copper as a form of ornament has a long history in the greater Indus region, and can be traced back to the early levels at the site of Mehrgarh, where there is evidence for a single copper bead from the Neolithic levels (Period IB), circa 6000 B.C. (26). Several copper ornaments have been reported from the subsequent layers, but these objects have not yet been analyzed, so details of composition and manufacture are still untails of composition and manufacture are still un 3500 B.C.) also contained corroded fragments of rods and pins. Two double spiral-headed pins show that the discovery of such pins in the later Harappan Phase sites no longer indicates connection with the much later Namazga III sites in the western and northern highlands. A fragmentary copper object from one grave of Mehrgarh Period III may be a compartmented seal, again indicating the presence of these objects in a context that pre-dates the Quetta-Namazga III complexes (26). The excavations at Mehrgarh and other sites of the pre-urban period provide clear evidentce for the gradual increase in importance of metal between the Early Food Producing and the settled farming villages. During the Harappan Phase, it is evident that metals supplement rather than replace the earlier materials used to manufacture ornaments.

An eye-dropper (*surmadani*), a mirror, and a hair pin

In fact, many metal ornaments are copies of beads, pendants, or bangles made in non-metal materials. There are some unique new types of metal ornaments, however, specifically those that incorporate gold, silver, and electrum. Metal also comes to be used in composite ornaments with other valued or symbolic materials, such as faience, various colored stones, and shell.

At present, the best clue we have to the role of metal ornaments in Indus society is their archaeological context. Unlike contemporaneous sites in Mesopotamia, almost all of the complete ornaments (e.g., necklaces and belts) found at Harappan sites have been recovered from hoards rather than from burials. Fentress (27) tabulated the metal objects from Mohenjo-daro and Harappa that were found in hoards vs. those found in non-hoard contexts, including burials. Although Fentress' table needs to be updated to include other sites, it presents some noteworthy patterns. Copper/bronze ornaments as well as copper/ bronze tools have been recovered primarily from non-hoard contexts. In contrast, gold and silver ornaments and silver vessels have been found almost exclusively in hoards. It is interesting that copper/bronze *vessels* have been found almost equally in hoard and nonhoard contexts.

When considering the distribution of ornaments, it is thus necessary to discriminate between copper/ bronze and metals such as gold and silver. Gold and silver ornaments have been found stored in ceramic, copper, or silver vessels that appear to have been deliberately hidden away. Some of these hoards include broken ornaments and melted lumps of gold or silver that would undoubtedly have been remelted and made into new ornaments. The hoards often contain numerous stone beads made from agate, carnelian, jasper, turquoise, and other varieties of colored stones. Copper beads and spacers are also included with some of the hoards, but copper ornaments have primarily been recovered in non-hoard contexts, such as in the debris accumulating in the streets or habitation areas, or in some of the burials. Out of 168 total copper/bronze ornaments reported, 130 were found in non-hoard contexts and only 38 were found in hoards, generally in association with gold and silver ornaments.

The presence of mirrors in the burials is intriguing, as they were made of a considerable amount of metal that could have been recycled. Metal mirrors are a new object during the Harappan Phase, as mirrors were not previously made in any material, either polished stone or metal, barring, of course, the copper mirrors discovered in the Kulli culture. Perhaps mirrors were needed by women in the afterlife, or the personal use of a mirror made it an object that could not be passed on to another individual at death. However, mirrors are not found in *all* female burials. One possibility is that such beliefs may have been important to certain groups within Harappan communities, while blades used as saws or scrapers, unmodified stone blades used as knives or scrapers, and a range of stone and bone points or awls.

Indus Inscriptions on Metal Objects: Although it has not been possible to make an exhaustive study of the types of metal objects on which inscriptions occur, the recent publications of inscribed objects from the Harappan sites reveal some interesting patterns. Large axes, adzes, spears, chisels, and sheets of copper often have one or more signs



Copper bangles

chiseled into one or both sides. The inscriptions are usually in a vertical line down the center but in the case of some celts, they are located at the butt edge. In most instances the script would be obscured by hafting or damaged during use, and this suggests that these metal tools may have had some specific ritual or symbolic function.

One category of metal object that was used almost exclusively for inscriptions is flat, square to rectangular copper tablets. At Mohenjo-daro hundreds of these inscribed tablets have been recovered. The inscriptions consist of Indus script and animal motifs, usually on both faces of the tablet. The engraving may have been done with either a stone burin or a bronze graver. So far this type of engraved tablet is unique to Mohenjo-daro, but copper tablets with raised script were found at Harappa by Vats and also by the Harappa Archaeological Research Project. Due to heavy corrosion, the techniques of manufacture have not yet been determined. The script on both types of tablets was not written in reverse and therefore these tablets were not intended to be used as seals, but represent some sort of ritual or economic token.

Metallurgical Comparisons: Traditional views of West Asian copper metallurgy assume an evolutionary progression from copper to arsenical copper, and then to tin bronze purely to exploit the mechanical advantages of these alloys, and see the use of tin bronzes predominantly to manufacture tools and weapons that benefited from the extra hardness of these alloys. These views are now being questioned. Alloying is increasingly discussed in terms of its aesthetic value, its status value and association with other exotic goods. Tin alloying does not appear to grow steadily more common in the manner expected of a new technology dispersing purely by virtue of its advantages over an older one. Egypt, in particular, provides a good example of this. There was little tin alloying as late as the Middle Kingdom, and there is evidence to suggest that it was used predominantly for its

coloring properties.

The most common metal used by the Harappans was unalloyed copper. What little tin alloying exists appears predominantly in tools; the typically unalloyed weapons consequently are interpreted as less important in terms of function, aesthetics or status (2). However, tin bronzes are also scarce in third Millennium Mesopotamia, and the majority derive from the high-status funerary contexts of the Royal Cemetery at Ur and 'Y' cemetery at Kish. It has been suggested that tin was, at this time, a highly valuable commodity, associated by common geographic origin with lapis and gold. Furthermore, no link has been confirmed between tin alloying and artifact type in Mesopotamia (18), a fact acknowledged by Kenoyer & Miller (2) despite assumptions that tin alloying predominated in items that would have benefited from its mechanical advantages.

The issue of comparing the Harappan alloy compositions with those of the Near East is not clear cut and we cannot draw a mono-causal association between alloying practices and the functional requirements of weapons of war. There is, however, the perceived inadequacy of Harappan weaponry due to its low tin content when compared with those of Mesopotamian weapons. The evidence, however, does not support this widely believed conclusion, mostly propagated by by Rao (11). Poorly alloyed or unalloyed weaponry was relatively common in Third Millennium Egypt and Mesopotamia as well as the Indus. The comparison of primarily domestic Harappan assemblages with Mesopotamian palace, temple and elite grave assemblages, which as high status objects may have had higher tin contents irrespective of function, is bound to give the impression of relative deficiencies in the Harappan material. Despite this, comparisons of technologically similar weapons from the two areas suggest similar levels of tin alloying, especially if one allows for the fact that the simpler, open-mould manufacturing techniques of Harappan weapons would have benefited little from the addition of tin.

A comparison of selected analyses of Early and Middle Bronze Age weapons from the Levant, mid-third Millennium Susa and Early Dynastic to Old Babylonian *Uruk* shows alloying trends comparable to those in the Indus (25). Nearly all the artifact types considered by archaeologists have a significant number of examples with little or no tin in them. Although the four analyzed Harappan blades (interpreted as spears) do not have a great deal of tin (maximum 2.6 per cent), neither do the Levantine tanged and riveted spearheads: tin is nor present in 15 of 20 such spears, and only one example has over 0.5 per cent. It is the socketed spears, and those from palace and temple contexts at Susa and Uruk, which are typically high in tin. Harappan daggers and knives show a wider range in tin levels, but these fall short of the most heavily alloyed examples from the Levant, Susa and Uruk. However, these are normally found in non-domestic contexts such as the Sinkasid palace at Uruk, and the two analyzed examples of Philip's Type 10 dagger (most comparable to Indus blades) have only 1.06 per cent and 2.68 per cent tin contents, well within the range of tin alloying in Indus daggers. Harappan axes have the highest levels of tin alloying amongst the Indus weapons, and are most comparable, in terms of tin content, with Near Eastern examples. This is remarkable considering the complexity of most Near Eastern designs (necessitating closed moulds which benefit greatly from the increased fluidity of the molten metal produced by the addition of tin) compared to the Harappan axes. However, the high level of tin in a flat axe from Uruk suggests that simplicity in design and manufacturing techniques do not directly equate to a lack of interest in tin alloying.

On the whole, the list of metal agricultural tools presents a stark contrast to those found in Mesopotamia. There is a shaft-hole axe and a superbly made mattock with a shaft hole. There are also

adzes and winged blades, split to fit onto wooden spades as 'shoes', sickle blades, bill-hook blades, and two- or single-edged knives. Very few of these tool types have any parallel in Harappan assemblages. Like the Indus Valley, the metal implements for agriculture are rare in Mesopotamia also, although an unusual hoard of agricultural tools dating to 1800 BC has been found at Tell Sifr. It included new and used tools deposited in a state workshop together with dated cuneiform tablets. There is no plowshare in sight.

The Role of Copper in the Harappan Economy and the Social Milieu: That metals played a significant role in the economic life of the Harappans is revealed by the presence of a number of metal objects in the material remains of their cities. Excavations produced almost 2000 metal artifacts at Mohenjo-daro and over 1000 at Harappa alone. No doubt if more detailed excavation techniques had been used, and all the more fragmentary metal examples recorded, the count of metal artifacts would have been even larger. If we consider the range of metal tools at different sites, we find that even small settlements like Lothal, Allahdino, and Chanhu-daro were rich in metal tool types. The most important find of such metallic objects was from Harappa where a large hoard of copper and bronze implements and other objects of daily use was discovered. More importantly, craft towns like Chanhu-daro had metal tool types comparable in range of form to those recovered at Mohenjo-daro and Harappa even though they were small settlements.

Copper and bronze seem to have been quite important in the Harappan eocenemic life. Their direct or indirect role in the spheres of subsistence, transportation, craft production, house building, the digging of wells, tree felling, and warfare is self evident: some of these spheres could have been dependent on metal technology. An indirect but very significant consequence of this dependence was the system of procurement of copper and tin ores, and copper alloys from different regions and the spreading of the Indus culture along the way. The general belief that the extensive trade activities of the Harappans was the result of the quest for metals and their raw materials notwithstanding, the trade in metal objects must have been substantive.

We can expect that ploughs and their shares were of hard wood or bamboo, which is a reasonable assumption given the nature of the pre-modern plough in much of South Asia. Here the role of metal seems to be marginal if at all. The same applies to the harvesting tools as metal blades are almost entirely absent. The asymmetric stone flakes (lunates) together with long chert blades are reported from Chanhu-daro, Harappa, and Surkotada and these seem to be the predominant tools of harvesting.

By the same token it may be inferred that some tools used for house building — digging foundations, brick making, brick laying, and roof laying — were made of metal. Ceiling rafters over 4 m long that were utilized at Mohenjo-daro would have had to be accurately spliced. How the Harappans dug ditches for irrigation and wells for the urban drinking water supply at cities like Mohenjo-daro is problematic. These wells are exceptionally deep and shovel-like tools must have been necessary. No such tool has, however, been recovered. Nevertheless, as Childe points out, the effective plough, wheeled cart and plank boat are all products of advanced carpentry which is not feasible without saws, chisels, and gouges. Such shapes, in turn, are possible only in metal.

Perhaps it was in Harappan craft production that metal tools were indispensable and it is here that that they played the most important economic role. Major Harappan crafts, like steatite seal carving, shell bangles and ladle production, ivory carving, and stone bead manufacture are known to have required metal tools. Dales and Kenoyer found that bangles of Masta shell required stones, stone anvils, sand,

water, and flaked stone blades for engraving, but that the thicker conch shell would first have to be sawed through with bronze implements before bangles could be fashioned from them. Where stone bead production is concerned, contrary claims have been made. Sawing would have required an abrasive (say the dust of quartz/ carnelian/ agate) for agate and carnelian are harder than copper or bronze. Known tools for bead drilling include flanged or collared bronze drills as at Chanhu-daro, or 'pencil-point' drills as at Mohenjodaro, Lothal, Shortughai(?) and Chanhu-daro, as well as tubular drills which have been found at Mohenjo-daro as well as at Harappa.

Because of the presumed high value of metal tools and ornaments, it is likely that the production and distribution of copper and its objects was controlled by the elite but total control could not have been possible due to the fact that metal can be recycled and modified using relatively simple processes, such as hammering and grinding. Merchants and owners often hid their stocks of raw materials and finished objects by burying them under the floor. The best-preserved metal objects found in the Indus cities have come from such hoards, buried in the house of a merchant or wealthy citizen who never returned to collect the treasure. One such hoard from Harappa consisted of a large cooking pot, covered by a bronze plate. Inside the pot were numerous copper weapons and tools; four axes with straight edges, eight shouldered axes, eight long and narrow blade axes, two unfinished double axes, two daggers with long tangs and tips curved back, seven tapered daggers, one marble mace head, thirteen spear heads, ten chisels, two thick bars, two saws, one arrowhead, one double-edged dagger, one lance head, one semi-oval chopper and one small bowl. Careful examination of the tools indicates that some of them were brand new and unused, others old and worn out from repeated sharpening. Similar hoards were found at Mohenjodaro (2) and Allahdino (1).
The copper and bronze objects of the Harappans were of utilitarian nature. Their broad-based distribution within the broad social groups is indicated by the context in which they are found distributed within a site. Fentress states that the highest frequency of metal objects was in the habitation area at Mohenjo-daro and not in the high mound with all of its public or monumental architectural units. Similarly, at Harappa, metal artifacts are relatively evenly distributed throughout the site, rather than being concentrated in any particular area. At Allahdino, as at Harappa, metal artifacts were found distributed throughout the site in a variety of contexts: inside structures and outside structures (in streets, drains, and trash deposits). Although the sample is limited, another striking characteristic of Harappan metal artifacts is a rare occurrence in graves. Other than a few beads or blades, metal objects are seldom found associated with burials. To sum up, it appears that except for obvious items of jewelry, metal artifacts were manufactured for use in daily activities and were available to a broad segment of Harappan society, urban or rural.

Although very little metal was buried with the dead, burials, like hoards, provide a context in which metal ornaments were intentionally placed by the Indus peoples. Metal objects found in burials are almost all of copper/bronze, and include mirrors, finger rings, bangles, and occasional beads. In one instance three gold beads were found, strung together with three stone beads. While the mirrors are invariably placed with female burials, the other metal ornaments have been found with both male and female individuals (28). It should be noted that no utilitarian copper/bronze tools have been found in the burials. The occasional pilfering of burials cannot be used to explain the low incidence of metal in undisturbed burials, especially the absence of elaborate gold and silver ornaments. Other ornaments that are noticeably absent are those made from exotic materials or involving complex production techniques, e.g., carnelian, faience, or stoneware. This pattern suggests that ornaments that represented wealth or status were passed on from generation to generation and recycled, much as is done today in the subcontinent (29).

The distribution of waste products from copper working at Mohenjo-daro suggests that small scale workshops may have been scattered throughout the city, catering to the needs of specific neighborhoods or to some individual sponsoring merchants. The contrast between centralized, largescale production and at the same time the existence of dispersed, small-scale production illustrates the complex forces at work within the Indus cities.

Conclusion: Harappan bronze varies widely in composition, just as it does in Mesopotamia and Central Asia. A chronological or sequential analysis is not possible but there is a general impression that the early bronzes were the alloys of copper with arsenic in different proportions, generally corresponding with those as they are represented in nature. Tin alloys seem to be a later invention. Here again, the proportion of tin in the alloy differed widely. Most of the times the amount of tin in the alloy is approximately in the same proportions as it occurs naturally in the copper ores. However, bronze objects with much higher content of tin are also known. It indicates that the mixing of tin with copper was deliberate. Besides copper, silver and gold is in evidence in the material culture of the Harappan cities although the increased use of silver seems to be transitory. Lead was produced in Baluchistan even in the Early Indus period but it is not known for what purpose.

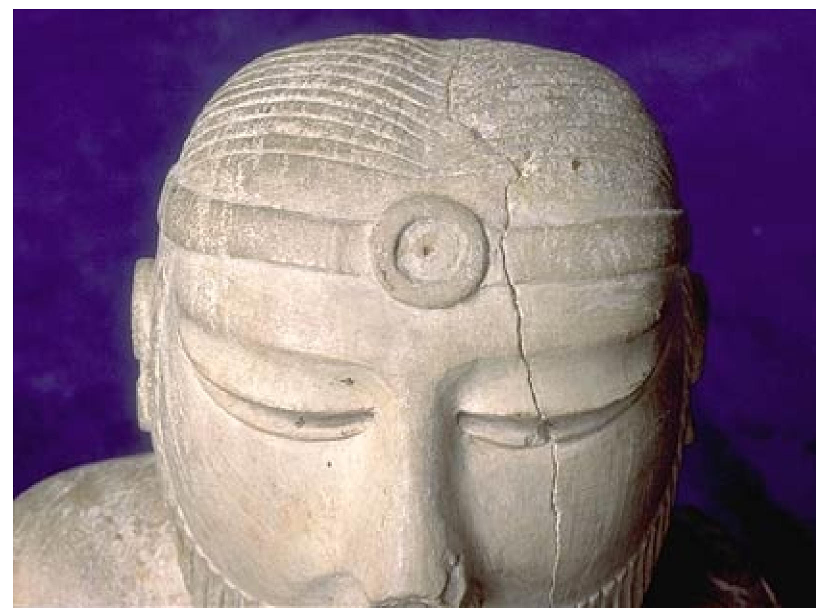
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Chapter 19

Miscellaneous Crafts and Technologies



Three of the most important groups of artifacts and the technologies involved have already been reviewed in the foregoing pages. There are, however, a few other crafts

and technologies that flourished in the Indus Valley during the Harappan Civilization and these need to be taken notice of. Just like the other arts and crafts, reviewed in the foregoing pages, these arts and crafts, and the technologies associated with them, had their roots in the Early Indus cultures of Baluchistan and the adjoining area of Sindh.

Since stone was the easiest raw material to be had, we observe a rich assemblage of stone artifacts and the technologies related to stone working. This includes lapidary work for which the Harappan Civilization must be the world famous in its times. Shell working was very common and rather elaborate. So was the ivory industry and its exquisite artifacts. The mundane technologies related to carpentry cannot be ignored but for the biological nature of its products, the available examples are non-existing. Add to it the technology of textile manufacturing for which the Indus Valley remained famous into the historic times. In the followings, we shall touch base with a few of these technologies and artifacts.

LAPIDARY

Lapidary is the art of working precious or semiprecious stones into beads or other form of ornamental components. Just like the making the chert blades and other tools, lapidary art was not new to the people of the Harappan Civilization: it has its technological base in the agricultural settlements of Baluchistan during the early Neolithic times. Thus, archaeology is able to supply a mass of evidence from the earliest Neolithic and the Early Harappan settlements in many regions of ancient Pakistan to testify to its longevity. The earliest sites are Mehrgarh III, Amri I, and Harappa. Recently, new bead making sites referable to the Indus tradition were identified at sites such as Lewan in Bannu Basin, Gazi Shah in Sindh (2), and Rehman Dheri (3). At Lewan, for instance, local and non-local semiprecious stones, jasper, quartz, striped and speckled metamorphic and igneous rocks, serpentine, quartzite, were exploited for the production of beads and other artifacts, such as grind stones. Bead making tools are considered as connected to a local microlithic tradition, and in

particular, drills are manufactured out of very small blades. There is evidence of some lapidary traditions at Sharhr-eSokhta II in eastern Iran also with which the Quetta Valley had intimate connection through the Kandhar region.Thus, the technique of making beads of semi-precious stones have long remained a special feature of Indus craftsmanship.

These traditions continued in the regional cultures of the Early Haappan phase and they were further developed in the urban phase, which we refer here as the Indus or Harappan Civilization. The archaeological evidence of lapidary's crafts is very common at almost every Harappan site and this shows that the lapidary art was widely practiced in the Indus Civilization.

Indus men and women wore a considerable amount of jewelry, which probably gave indication about their social standing. Their stone and terracotta figurines and the human figures carved intaglio on their seals amply demonstrate how much they enjoyed adoring themselves with headbands, earrings, necklaces, bracelets, bangles and waistbands. Almost all Harappan sites have yielded large quantities of lapidary trinkets, especially beads. Indus beads were also much prized by other societies and were among the exotic materials found in Mesopotamian graves.

Beads are by far the most popular form of ornamentation that survive in the archaeological record of the Indus Civilization. If one includes the masses of steatite microbeads, there are hundreds of thousands of beads, in a wide array of types and material, each requiring its own manufacturing technology. This is a large subject, far larger than can be fully covered here. We shall touch only a few topics here.

Harappan beads are varied in their shape and material. Some are cylindrical, globular, spheroidal, biconical, or segmented and some are waferlike. Many a time, they are decorated with trefoil or circular designs. The occurrence of these beads in abundance and in many varieties at nearly all Harappan sites clearly shows how much they were appreciated. Some of the beads are very elegant and reveal skilled workmanship. They are an index to the sophisticated taste of the Harappan elite. They also demonstrate deftness, skill, patience and painstaking labor on the part of the craftsmen who made them. Bead industry seems to be well developed in the Greater Indus Valley and Saurashtra as shown by the factories discovered at Chanhu-daro also made beautiful gold ornaments and ivory oband ostensibly at Lothal. Beads were made of ag Miscellaneous Crafts! jects.

ate, carnelian, faience, shell, terracotta, gold, silver Gujarat has often been mentioned by ar Indus men and women wore a considerable amount of jewelry, which probably gave

and steatite. Inlay work and etchings on beads chaeologists as a source of agate but it does not indication about their social standing. Their stone and terracotta figurines and the human

made them coveted objects both in the Greater Inseem likely. Since the beads of these stones have figures carved intaglio on their seals amply demonstrate how much they enjoyed

dus Valley and West Asia.

Among semi-precious stones, jade and lapis

been found in very early times at Mehrgarh, a time adoring themselves with headbands, earrings, necklaces, bracelets, bangles andperiod when the Indus man had not discovered the waistbands. Apparently, both men and women wore jewelry, an important part of which

lazuli were used, but carnelian and agate were the area east of the Indus, any source in the east could consisted of beads. Almost

all Harappan sites have yielded large quantities of these
stones in which the Indus artisans mainly worked. not have come in question. On the other hand, thetrinkets. Indus beads were also much prized by other societies and were among the
exotic materials found in Mesopotamian graves.


Miscellaneous Crafts!

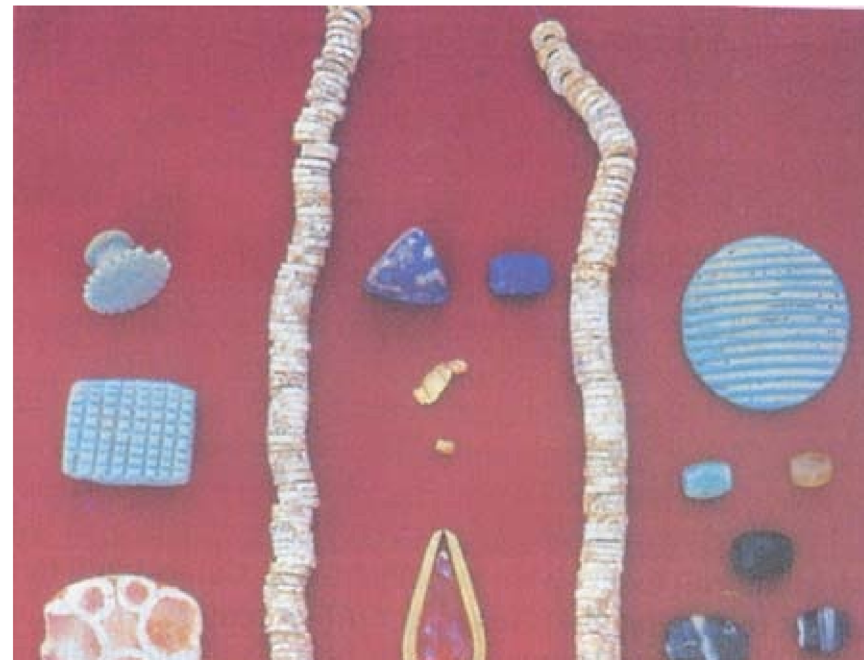
early Indus people were quite familiar with their 'homeland', that is, Baluchistan and had close relationship with Afghanistan and Central Asia on regular basis. It was but natural that they looked for their raw materials in that region. The source of lapis lazuli has often been sited as the Indus outpost of Shortugai on the Oxus. Similarly, the source of turquoise is often speculated to be in northern Iran. It is very well

faience that they colored to resemble lapis lazuli or turquoise. Thus, they were the first possible that these were indeed 'artificial stones' ever made by man.
the sources of lapis but it is also found right at the doorsteps of The Harappans went to great efforts to obtain exotic colored stones for making beads of differ
The Harappans went to great efforts to obtain exotic colored stones for making the Indus Valley, that is at and The stones used for bead making were obtained from the upland regions of Baluchistan
beads of different shapes and sizes and Afghanistan. Gujarat has often been mentioned by Indian archaeologists as a source
Harappan beads are varied in their shape and material. Some are cylindrical, globular,
of agate but it does not seem likely.
spheroidal, biconical, or segmented and some are waferlike. Many a time, they are
Turquoise, jasper and chalcedony would complete
decorated with trefoil or circular designs. Materials included gold, silver, copper, and
the list. The Indus people rarely used lapis lazuli or early times at shell but more so is the use of colored stone, such as carnelian, agate, chalcedony,
turquoise, beautiful blue stones that had been val
steatite, lapis lazuli, and turquoise. The occurrence of these beads in abundance and in
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many varieties at nearly all Harappan sites clearly shows how much they were
Early Harappan period or even before. Instead, they
appreciated. Some of the beads are very elegant and reveal skilled workmanship. They
preferred stones like agate, chalcedony, jasper, and
are an index to the sophisticated taste of the Harappan elite. They also demonstrate
carnelian that were harder to work but retained a

deftness, skill, patience and painstaking labor on the part of the craftsmen who made them.
high polish, unlike the softer lapis and turquoise,
On the other hand, he was quite
which soon became dull with time. The Haraooans
Among semi-precious stones, jade and lapis lazuli were used, but carnelian and agate

also made beads of faience that they colored to
were the stones in which the Indus artisans mainly worked. Turquoise, jasper and
resemble lapis lazuli or turquoise. Thus, they were
chalcedony would complete the list. The Indus people rarely used lapis lazuli or
the first 'artificial stones' ever made by man.
turquoise, beautiful blue stones that had been valued in the westerly region and traded in

As stated above, lapis lazuli is comparativelyregular basis. It was but natural that
from the Early Indus period or even before. Instead, they preferred stones like agate,
rare, though unfinished examples from Chanhu
chalcedony, jasper, and carnelian that were harder to work but retained a high polish,
daro indicate a local manufacture. Badakshan is



unlike the softer lapis and turquoise, which soon became dull. They made beads of
generally considered the nearest source of lapis. It
may, however, be noted that numerous so-called lapis objects have turned out to be azurite on analy
Page 396The source of lapis lazuli has often been sited as the Indus outspost of

sis and this mineral is widely distributed in Baluchi highland. Banded, agate, variegated jasper and redShortugai on the Oxus. Similarly, the orange carnelian were among the most commonly source of turquoise is often speculated used materials, obtained from distant sources into be in northern Iran. It is very well Kutch and Gujarat, as well as widely distributed

possible that these were indeed the

sources, one in the Chagai hills of southern Balusources lapis and turquoise,

chistan and other in Badakhshan, northern Afghani

respectively, but both of these stones

stan. Turquoise also may have been obtained from southern Baluchistan or from the more distant reare also found right at the doorsteps of gions of northern Iran, but neither of these stones the Indus Valley, that is at and around was very popular with Indus city consumers. When

Chaghai Hills in Baluchistan.
worn as beads, these relatively soft stones become Turquoise and lapis lazuli were dull or change color. This may have stimulated the
imported into Mehrgarh even during
production of glazed faience beads that could be
the Neolithic times in
colored to look like turquoise or lapis lazuli. They the 6th


A sample of Harappan lapidary art

A sampling of Harappan lapidary art

415 millennium B.C. The large number of beads discovered at sites of the subsequent Early Indus period and the evidence for local factories during the Harappan period shows that bead-making continued without a break. The lapidary craft of the Indus Civilization, thus, marks a logical development of an older tradition of the Greater Indus Valley.

around Chaghai Hills in Baluchistan. Turquoise was probably “imported”. It was found at Mehrgarh dur
Some examples of chiseled hole instead
ing the elementary agricultural settlement. The large
of drilling them out. These are early ex
number of beads discovered at sites of the subse
amples of Harappan period lapidary
quent Early Harappan period and the evidence for local factories during the Harappan period shows that bead-making continued without a break. The

alongside other craft activities, in small individual workshops. Various types of beads Harappan Civilization - The Material Culturewere made, using a variety of techniques related to the different materials and end products.

ing areas of Chanhu-daro and Mohenjo-daro with Banded agate was particularly prized and was
the Harappan sites in Gujarat, such as the so-called
worked so as to expose symmetrical patterns of
'bead factory' at Lothal, we have to conclude that it
bands
around
the
could not be considered a manufacturing site. In
body of the bead or
particular, the inventory of finds does not corre
longitudinally, making eye patterns that may
have
spond with what one would expect: chert bladelets
had some significance in popular and chert knapping debitage, agate flakes and their
lapidary crafts of the Indus Civilization, thus, mark a
superstition, such as for warding off the evil eye. Some very interesting beads have been
exhausted cores, constricted and tapered drills are
logical development of an older tradition of thefound at Harappa also. A large cache of agate and carnelian beads was discovered byconspicuous by their absence. Inspection of the Greater Indus Valley.Fairservis at Allahdino. Similar hoards have beennearby surface during several visits by archaeoloreported at Mohenjodaro and Agate and particularly carnelian bead making gists failed in revealing any waste dumps. Rao (5) Harappa. was probably the first craft to reveal the impressive has reported the find of two hoards of finished and standards of Harappan technology. At the site of
unfinished beads but, unfortunately, so far no tech
The sophisticated techniques involved in producing Indus beads have been worked out Chanhu-daro, Mackay came across large amounts nological detail has been given.
of industrial refuse from bead making workshops,
by experiment and by observing modern beadmakers in Afghanistan, Pakistan, and
With the rise of the Indus cities bead-making
including defective or discarded carnelian nodules,
India. These studies have revealed the amazing lengths of time and effort as well as the
became highly specialized in order to meet the
roughouts and beads, raw materials for drill manuskills that were involved. The same basic techniques continued to be used until recent needs of urban elites and the traders. Stone beads facture,
and debitage for drill making (4). Other
continued to be produced at many sites using the
times, and are still used by lapidaries in many parts of these countries, only slightly scattered evidence of bead making, although not
modified by modern technology.
concentrated within isolated workshops, were dis
covered by Vats at Harappa. Beads are by far the most popular form
Similarly a limited amount of finished beads
of ornamentation that survives in the

(11 agate items out of 1050 beads in various mate
rials) has been reported from the excavations atarchaeological record of the Indus
Surkotada in Gujarat. A similar situation has been

Civilization. If one includes the masses
identified at Lothal and Dholavira. On the strengthmicrobeads, there are of steatite
of these meager findings, Gujarat has been de
hundreds clared the source of agate for the Harappan Civili of thousands of beads, in a
zation. However, when we compare the bead makwide array of types and material, each
Miscellaneous Crafts!
requiring its own manufacturing

technology. This is a large subject, far
larger than can be fully covered here.
We shall touch only a few topics here.

Long Cylindrical Beads: The making
of exceptionally long, biconical,


A bead maker in Punjab drilling a bead the
A bead maker in Punjab drilling a bead the Harappan Harappan way
way.

cylindrical beads of carnelian was a staggering technical achievement of the Indusearlier techniques, but in some larger towns and
cities specialized workshops began to manufacture
lapidary. Many of the long carnelian beads were traded as far as Mesopotamia, where

unique styles of beads using new raw materials and they have been found in the burials of the royal cemetery at Ur. The belts, containing
new techniques of manufacture. A highly functional

these long biconical beads have been found at Mohenjodaro, Harappa, and Allahdino,
constricted cylindrical drill was made from a rare
and individual beads exist throughout the Indus Valley and the Harappan sites of form of
metamorphic rock, which may have been



A collection of stone beads from Harappa (after Kenoyer)

Mohenjodaro, Harappa, and Chanhu-daro, where they were used to perforate beads *Kenoyer*)

further modified by heating. These beads and the drills to manufacture these beads have been found Page 399at most of the larger sites such as Mohenjo-daro, Harappa, and Chanhu-daro. New techniques were invented to decorate stone beads with permanent designs and to make imitation turquoise and agate or carnelian beads from artificial materials such as faience and fired steatite.

Often, bead-making took place alongside other craft activities, in small individual workshops. Various types of beads were made, using a variety of techniques related to the different materials and end products. Banded agate was particularly prized and was worked so as to expose symmetrical patterns of bands around the body of the bead or longitudinally, making eye patterns that may have had some significance in popular superstition or the aes**A collection of stone beads from Harappa (** thetic sense of the elite. A large cache of agate

made from hard agate, carnelian and jasper. Important discoveries in drilling beads made it possible to produce long slender beads of agate and carnelian. New techniques and carnelian beads was discovered by Fairservis were invented to decorate stone beads with permanent designs and to make imitation turquoise and agate or carnelian beads from artificial materials such as faience and fired416
Page 398
at Allahdino. Similar hoards have been reported at Mohenjo-daro and Harappa as well as at Lothal.

The sophisticated techniques involved in producing Indus beads have been worked out by experiment and by observing modern beadmakers in Afghanistan, Pakistan, and India. These studies have revealed the amazing lengths of time and effort as well as the skills that were involved. The have been the social background on which, in the 2nd millennium BC, were built and formalized the much simpler social categories of the Varna system.

LongCylindricalBeads: The making of exceptionally long, biconical, cylindrical beads of carnelian was a staggering technical achievement of the Indus lapidary. Many of the long carnelian beads were traded as far as Mesopotamia, where

they have been found in the burials of



the royal cemetery at Ur. The belts, containing these long biconical beads have been found at Mohenjo-daro, Harappa, and Allahdino, and individual beads exist throughout the Indus Valley and the Harappan sites of adjacent regions.
Detailed studies of the manufacturing waste and finished beads from Chanhudaro, supplemented by ethnographic and experimental studies among modern agate beadmakers in Afghanistan, Pakistan, and India, have made it possible to reconstruct the basic processes of manufacture. First, long nodules of carnelian were brought to Chanhu-daro

Miscellaneous Crafts !from far off mines. After drying in the sun for several months these nodules adjacent regions. were heated in shallow ovens to make
the agate more stable and easier to
A close-up of a necklace, showing long biconical carnelian beads
Detailed studies of the manufacturing waste and finished beads from Chanhu-daro,
saw. Larger nodules were sawed
supplemented by ethnographic and experimental studies among modern agate
lengthwise to produce two or more seg
beadmakers in Afghanistan, Pakistan, and India, have made it possible to reconstruct
ments that were then chipped to make
same basic techniques continued to be used untilthe basic processes of manufacture. First, long nodules of carnelian were brought to recent times, and are still used by lapidaries in Chanhu-daro from far off mines.
bead roughouts. These roughouts may have been
After drying in the sun for several months these reheated to deepen the red color, which also made many parts of these countries, only slightly modified
nodules were heated in shallow ovens to make the agate more stable and easier to saw.
the hard agate easier to grind. Using a copper
by modern technology. Larger nodules were sawed lengthwise to produce two or more segments that were then

Vidale makes a very significant obserchipped to make bead roughouts. These roughouts may have been reheated to deepen vation: The imitation of various semiprecious rawthe red color, which also materials such as turquoise, lapis lazuli, carnelianmade the hard agate easier to and shell by artificial replicas (mainly terra cotta,grind. Using a copper-tipped talc and faience-related materials) allowed the prostake and a soft antler or horn vision of differently ranked categories of people withhammer, the worker shaped different ranks of ornaments (22).The addition ofthe bead blank by indirect new artificially created materials to the array ofpercussion and sometimes by semiprecious raw materials allowed an increasedpressure flaking with a copper number of layers of hierarchy to be represented andor antler point. These it is clear that technology became an important tooldelicately shaped bead blanks for categorization of people arranging themselves inwere then partially ground on new orders. A fascinating aspect of this evolution is grooved sandstone that while the forms of some important ornamentquartzite grinding stones. types remained basically simple and stable across time and particularly during the Harappan phase,The blank was now ready to the materials employed multiplied. If stability of form be drilled. They were able to promoted an image of cultural homogeneity, socialaccomplish this feat by using integration and social stability through time, then anconstricted extended hierarchy of base materials might havecylindrical drill made from a been the most efficient key for categorising a diverrare form of fine-grained sifying social pyramid. The two aspects (stability ofmetamorphic rock

that is a form vs hierarchy of materials) are completely intemottled gray-and-tan color . grated and intimately support each other. TheseBy heating this rock they various processes might have concurred in develchanged the original oping, within Indus societies, a complex hierarchy ofcrystalline structure to create social personae and functions. This hierarchy mightan artificial material composed

417 primarily of quartz, sillimanite, mullite, hematite and titanium-oxide phases. This extremely hard and durable material is referred to as "Ernestite" in honor of J.H.Ernest. Due to the hardness of "Ernestite," it may have taken a full day of heating, chipping and grinding to make a single drill, and as many as six different sizes of drills were used to

perforate a single bead (not counting broken drills).
or


A belt or necklace made of long conical beads of carnelian

A belt or necklace made of long conical beads of carnel

and Harappa, as well as the Indus carnelian trade beads found in far-off Mesopotamia. He carefully excavated and collected all stages of bead manufacture along with the associated tools, providing later scholars with a

unique window on an important Indus craft.

tipped stake and a soft antler or horn hammer, the worker shaped the bead blank by indirect percus Indus beadmakers have the distinction of producing the
sion and sometimes by pressure flaking. These
longest and most slender beads of carnelian in the
delicately shaped bead blanks were then partially
world, prior to the advent of diamond drilling. The ground on grooved sandstone or quartzite grindingimportance of long carnelian beads to Indus ornament
stones.styles can only be fully appreciated when compared
with the imitations that
The blank was now ready to be drilled. The
were made in terracotta.

as the Indus carnelian trade beads found in far-off Mesopotamia. He carefully excavated and collected all stages of bead manufacture along with the asso

Process steps for the manufac
ture of long cylindrical beads, ciated tools, providing later scholars with a unique

which became one of the characwindow on an important Indus craft. Indus beadteristics of the Harappan lapidarymakers have the distinction of producing the longest art and most slender beads of carnelian in the world,

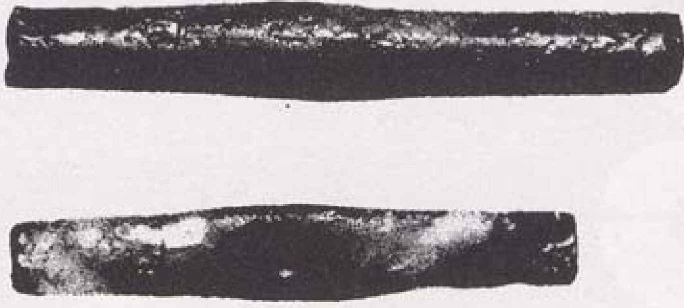
Harappan artisans were able to accomplish this feat prior to the advent of diamond drilling.Painted with red pigment to look like carnelian, these long terracotta beads, made into

by using a specially constricted cylindrical drill made
from a rare form of fine-grained metamorphic rock
that is a mottled gray-and-tan color. By heating this

The importance of long carnelian beads to

long necklaces or chokers, are found in all of the Indus settlements. When worn as a belt IHarappan ornament styles can only be fully appreor necklace, terracotta beads strike against one another to make a delicate clinkingciated when compared with the imitations that were sound, not unlike that produced by the real carnelian beads. In modern Pakistan and made in terracotta. Painted with red pigment to look

India, the sound of ornaments like carnelian, these long terracotta beads, made



is often referred to in poetry to into long necklaces or chokers, are found in all of

evoke sensual beauty, and the the Indus settlements. When worn as a belt or necksound of beads and bangles lace, terracotta beads strike against one another toclinking against one anothermake a delicate clinking sound, not unlike that promay have been just asduced by the real carnelian beads. In modern PakiMiscellaneous Crafts!important as the visualstan the sound of ornaments is often referred to insymbolism evoked by Indus

bead. The beads on the belts from Allahdino and ornaments. Mohenjodaro, ranging from 6 to 13 cm in length,

Interestingly, there are four

Work-in-process for the manufacture of biconical barrelsites in West Asia where thewould have required between three and eight days of Work-in-process for the manufacture of biconical barrel-

shaped long beads found in a workshop at Chanhu-daro Indus long barrel-cylinder**shaped long beads found in a workshop at Chanhu-daro**

steady drilling to perforate. Most modern bead drillers
in Gujarat take long breaks after every few hours ofrock they changed the original crystalline structure work due to the strenuous nature of the drilling process.to create an artificial material composed primarily of Considerable time is also taken in the preparation and

quartz, sillimanite, mullite, hematite and titanium oxide phases. This extremely hard and durable ma

repair of drill bits. Some of these long beads have been

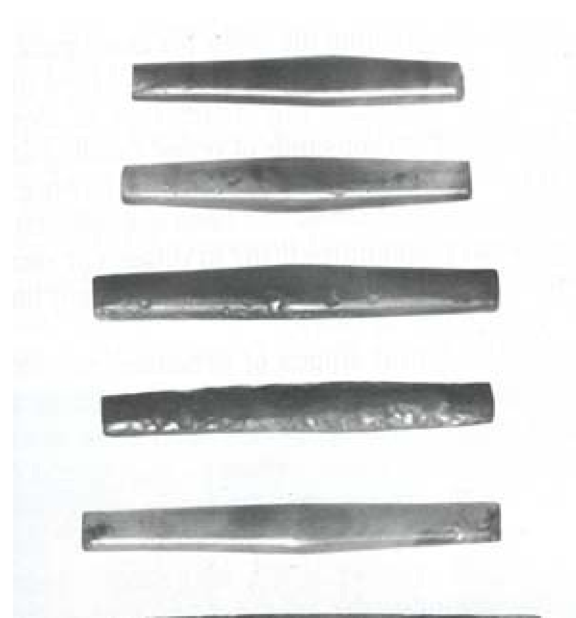
terial is referred to as "Ernestite" in honor of

J.H.Ernest. Due to the hardness of "Ernestite," it

found in various stages of manufacture at Chanhu-daro, may have taken a full day of heating, chipping and
from where the process of manufacture can be deduced.

grinding to make a single drill, and as many as six different sizes of drills were used to perforate a sin gle bead (not counting broken drills).

The manufacture of long carnelian beads may have Drilling experiments indicate that "Ernestite"



taken place at some of the larger cities, but so far, the

drills could perforate carnelian at a rate of 2.5 mm per hour, which was more than twice as effective as

only confirmed workshop is at the site of Chanhu-daro

jasper or copper drills used with hard corundum (ruby) powder. Even then, it would have taken more

in Sindh. Ernest Mackay was excited by the discovery than twenty-four hours, or three eight-hour working
of the Chanhu-daro workshop because of his familiarity

days of steady drilling, to perforate a 6 cm long bead. The beads on the belts from Allahdino and

with the striking beaded belts found at Mohenjodaro Mohenjo-daro, ranging from 6 to 13 cm in length,
and Harappa, as well as the Indus carnelian trade beads

would have required between three and eight days
of steady drilling to perforate. Most modern bead

found in far-off Mesopotamia. He carefully excavated

drillers in Gujarat take long breaks after every few
hours of work due to the strenuous nature of the

and collected all stages of bead manufacture along withdrilling process. Considerable time is also taken in
the associated tools, providing later scholars with a

the preparation and repair of drill bits. Some of
these long beads have been found in various
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Indus beadmakers have the distinction of producing the

The manufacture of long carnelian beads
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Process steps for the manufacture of long cylindrical

ture of long cylindrical beads,
importance of long carnelian beads to Indus ornament

because of his familiarity with the striking beaded **beads, which became one of the charac- teristics of the**

belts found at Mohenjo-daro and Harappa, as well which became one of the charac
styles can only be fully appreciated when compared teristics of the Harappan
lapidary 418 art were made in terracotta. Painted with red pigment to look like carnelian, these long terracotta beads, made into
long necklaces or chokers, are found in all of the Indus settlements. When worn as a belt

Ancient Pakistan - An Archaeological History
Miscellaneous Crafts**!** poetry to evoke sensual beauty, and the sound of

Indus artisans created manybeads and bangles clinking against one another variations of

may have been just as important as the visual sym

these permanent white designs and painted

bolism evoked by Indus ornaments.

them on
various bead
Interestingly, there are four sites in West Asiashapes. Some

where the Indus long barrel-cylinder beads of car

lenticular (shaped like a biconvex lens) beads

nelian have been found. These are: Kish, Ur, Jala

had single eye designs on designs. Spherical

bad and Susa. Each of these sites has also pro

duced etched carnelian beads (see below). At bothbeads often had three eye-motifs painted with

Ur and Kish the earliest occurrence of this bead

concentric circles around the perimeter of the

type is Pre-Sargonic which is also the earliest con

bead. At Harappa an imitation eye bead was

text for etched carnelian beads. The long barrel

cylinder carnelian beads are thus one of the earliestmade from white and red brown faience. This

pieces of evidence for Indus-Mesopotamia contact;

unique bead is the only example of red

it amply vindicates Mackay's original postulate of an

earlybrown colored faience in the Indus Valley.of

these beads indicate that some of them were made

Macayin the Indus Valley, whereas other examples, madefound one practicing craftsman in

with Indus drilling technology and Indus raw materials
may
have
been
produced
in

modern Sind near Lake Manchar who gave

Mesopotamian

styles for Mesopotamian elites. It is possible that these beads were made by migrant Indus artisans residing in Mesopotamia, members of the so-called Meluhhan minority that are documented in Mesopotamian texts.

It has been confirmed that the beads found in Mesopotamia are drilled with the unique technique of the Indus Valley, yet the faceted shape, of which some of these beads are, is a style that was never produced in the Indus workshops. The pear-shaped decorated carnelian beads is also a shape that was never produced in the Indus Valley. These clues suggest that merchants or entrepreneurs from the Indus valley may have set up shops in cities such as Ur to market their goods and also produce ob

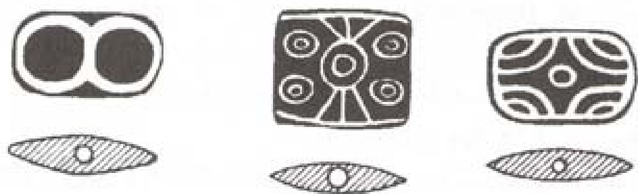


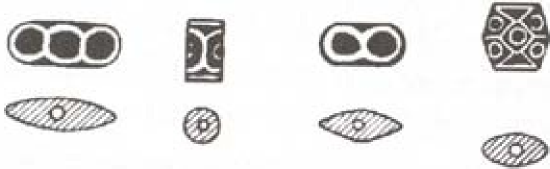
jects in local designs. If this can be confirmed

After 4500 years, the original white bleached
through further studies, it would be the earliest evidence for a pattern that came to be the norm in later
design on this carnelian bead from Balakot

beads of carnelian have been found. These are: Kish, Ur, Jalabad and Susa. Each of these sites has also produced etched carnelian beads (see below). At both Ur and Kish the earliest occurrence of this bead type is Pre-Sargonic which is also the earliest context for etched carnelian beads. The long barrel-cylinder carnelian beads are thus one of the earliest pieces of evidence for Indus-Mesopotamia contact; it amply vindicates Mackay's original postulate of an early Indus-Sumer contacts. Detailed studies of these beads indicate that some of them were made in the Indus Valley, whereas other examples, made with Indus drilling technology and Indus raw materials may have been produced in Mesopotamian styles for Mesopotamian elites. It is possible that these beads were made by migrant Indus artisans residing in Mesopotamia, members of the so
-called Meluhhan minority that are documented in Mesopotamian texts.

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Indus artisans created manysuggest that merchants or entrepreneurs from the Indus valley may have set up shops in A selection of Indus etched beads from cities such as Ur to market their goods and also produce objects in local designs. If this
these permanent white designs and painted can be confirmed through further studies, it would be the earliest evidence for a pattern them
on
that came to be the norm in later historical times, when craftsmen and merchants from various bead shapes. Some Pakistan extended their trade network throughout West and Central Asia.

him

lenticular (shaped like a biconvex lens) beads

a demonstration of producing an Carnelian "Etched" Beads: Throughout Asia ’etched’ carnelian bead. The had single eye designs on designs. Spherical the red orange carnelian is a symbol of blood,

beads often had three eye-motifs painted with power and fertility. Indus bead-makers developed

began with the juice extracted from the special techniques to heat carnelian to deepen the

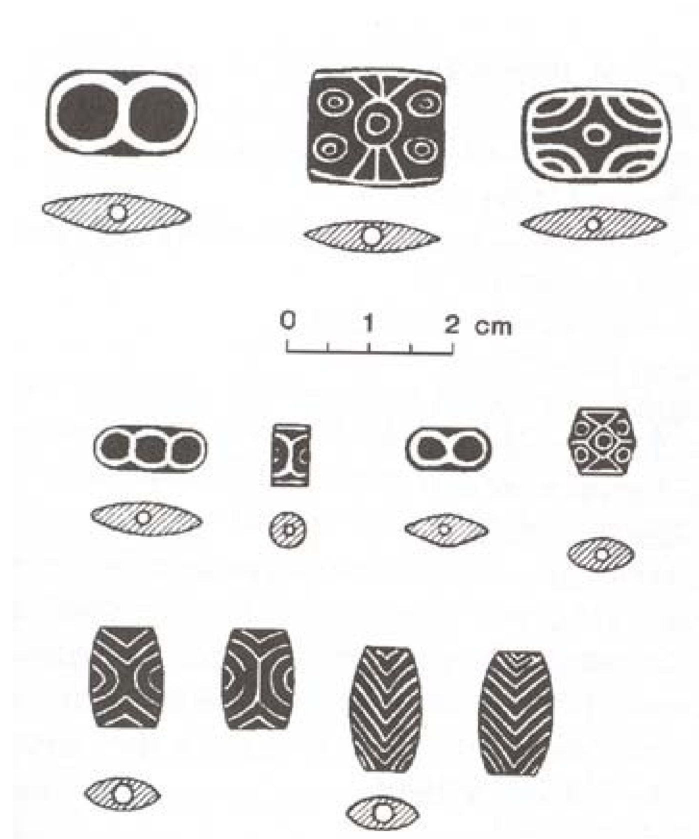
concentric circles around the perimeter of the red color and they were skilled at bringing out

tips of young shoots of a bush called the natural designs of banded agate. Beads with
***kirar*bead. At Harappa an imitation eye bead washorizontal banding and vertical banding were in Sindhi. The artisan then ground prepared from natural agates and made from white and red brown faience. This occasionally imitations were made by laminating washing soda (sodium carbonate) to a unique bead is the only example of red different colors of shell and stone. Apparently, fine powder and mixed it with water in a one especially coveted band design was an eye in brown colored faience in the Indus Valley. red and white: a color combination also used for cup. He poured a small quantity of this**

A typical Harappan 'etched' the circular designs on the cloak of the "priest Macay found one practicing craftsman in king" sculpture. Variegated jasper with spherical structures and some varieties of onyx

modern Sind near Lake Manchar who gave found in Gujarat and Baluchistan are the only natural stones that produce such eye patterns. Because these natural stones were extremely rare. the Indus artisans developed techniques to make imitation red-and-white eye beads.

Permanent white designs were bleached onto carnelian beads by painting the design with a solution of calcium carbonate, then heating the beads in a kiln. However, the



whitening process weakens the surface of the bead, and depending on the soil conditions, it can weather away after several thousand years. Early scholars often referred to such beads as etched

carnelian, because the eroded design surface appeared

A selection of Indus etched beads from Chanhu-daro (after Mackay)
to have been etched.


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imitation red-and-white eye beads.

After 4500 years, the original white bleached **After 4500 years, the original white bleached design on**

design on this carnelian bead from Balakot **this carnelian bead from Balakot has weathered away,**

historical times, from Pakistan extended their trade network

throughout West and Central Asia. of an etched design (after Kenoyer) **Carnelian “Etched” Beads:** Throughout
Asia the red orange carnelian is a symbol of blood,
power and fertility. Indus bead-makers developed
special techniques to heat carnelian to deepen the
red color and they were skilled at bringing out the
natural designs of banded agate. Beads with horizontal banding and vertical banding were skillfully prepared from natural agates and occasionally imitations were made by laminating different colors of
shell and stone. Apparently, one especially coveted
band design was an eye in red and white: a color
combination also used for the circular designs on
the cloak of the "priest-king" sculpture. Variegated
jasper with spherical structures and some varieties
of onyx found in Gujarat and Baluchistan are the
only natural stones that produce such eye patterns.
Because these natural stones were extremely rare.
the Indus artisans developed techniques to make

these permanent white designs and painted them has weathered away, leaving the appearance **leaving the appearance of an etched design (*Kenoyer*)** A selection of Indus etched beads from Chanhu-daro (after Mackay)

of an etched design (after Kenoyer)
when
craftsmen
and
merchants
has weathered away, leaving the appearance
Indus artisans created many variations of

him a demonstration of producing an ’etched’ carnelian began with the juice extracted from the tips of young shoots of a bush called *kirar* in Sindhi. The artisan then ground washing soda (sodium carbonate) to a fine powder and mixed it with water in a cup. He poured a small quantity of this

Macay found one practicing craftsman in modern Sind near Lake Manchar who gave

on various bead shapes. Some lenticular (shaped silicate) and other minerals, pyrophillite (a rarer
A selection of Indus etched beads from

like a biconvex lens) beads had single eye designs. Chanhu-daro (after Mackay) aluminum silicate, never reported from prehistory of Spherical beads often had three eye-motifs painted him a demonstration of producing an Pakistan) and sometimes rocks of chlorite group with concentric circles around the perimeter of the The process (aluminum magnesium iron silicates) which was bead. At Harappa an imitation eye bead was made began with the juice extracted from the more common on the western front in Iran.

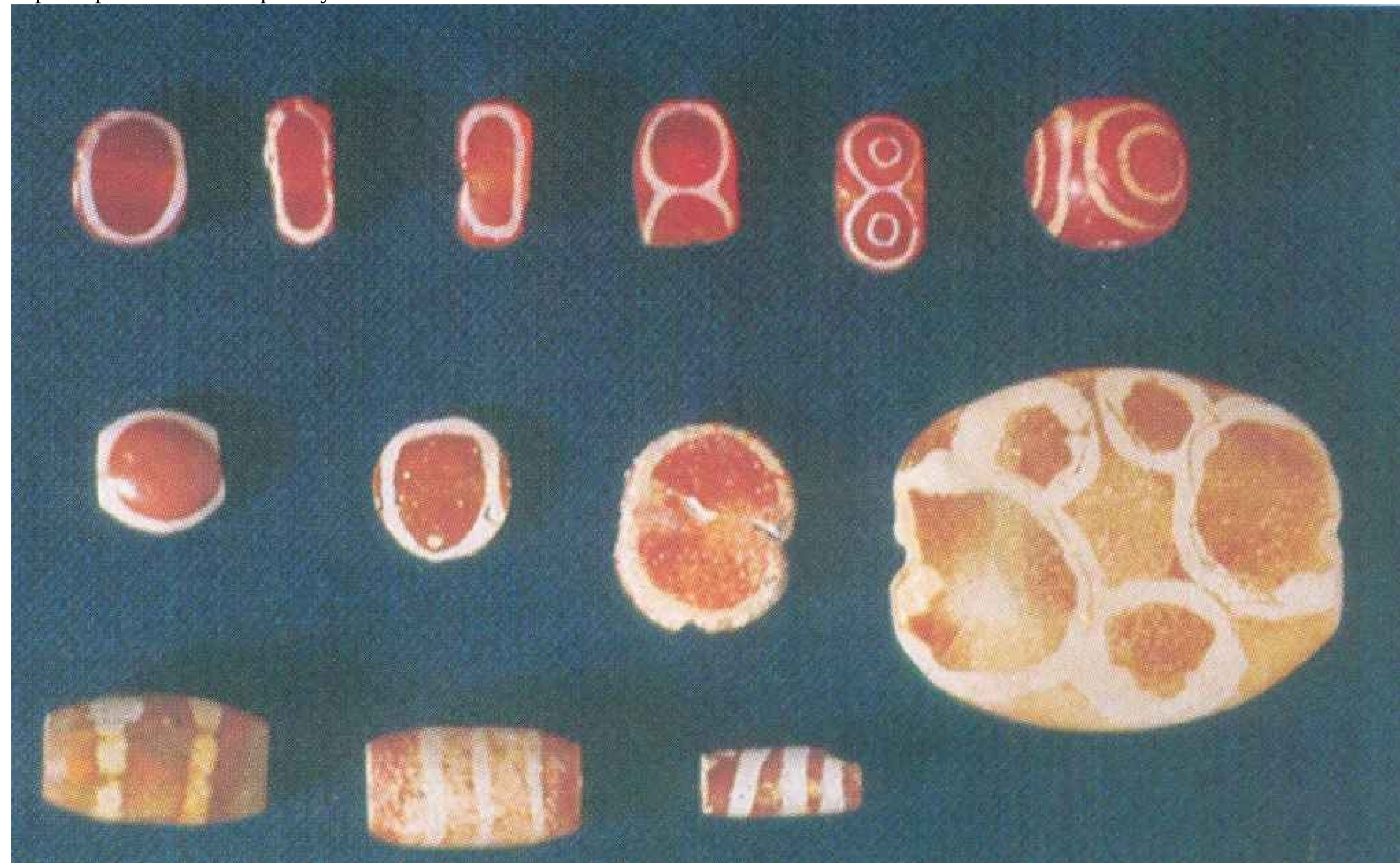


from white and red brown faience. This unique bead tips of young shoots of a bush called It is difficult to overestimate the role of this is the only example of red brown colored faience in

kirar in Sindhi. The artisan then ground

washing soda (sodium carbonate) to a rock and associated minerals (particularly talc) and the Indus Valley.
design on this carnelian bead from Balakot
has weathered away, leaving the appearance
of an etched design (after Kenoyer)

fine powder and mixed it with water in a their geographical distribution in the development of
cup. He poured a small quantity of this



A selection of Indus etched beads from Chanhu-daro (after Mackay)

A selection of Indus etched beads from Chanhu-daro (*Mackay*)

Page 403

Permanent white designs were bleached onto carnelian beads by painting the design with a solution of calcium carbonate, then heating the beads in a kiln. However, the whitening process weakens the surface of the bead, and depending on the soil conditions, it can weather away after several thousand years. Early scholars often referred to such beads as etched carnelian, because the eroded design surface appeared to have been etched.

Mackay found one practicing craftsman in modern Sindh near Lake Manchar who gave him a demonstration of producing an 'etched' carnelian bead. The process began with the juice extracted from the tips of young shoots of a bush called *kirar* in Sindhi. The artisan then ground washing soda (sodium carbonate) to a fine powder and mixed it with water in a cup. He poured a small quantity of this on the *kirar* and rubbed the whole carefully together to a semi-liquid mass. Then the craftsman strained this mixture through a piece of linen into a large empty mussel shell, and the 'paint' was

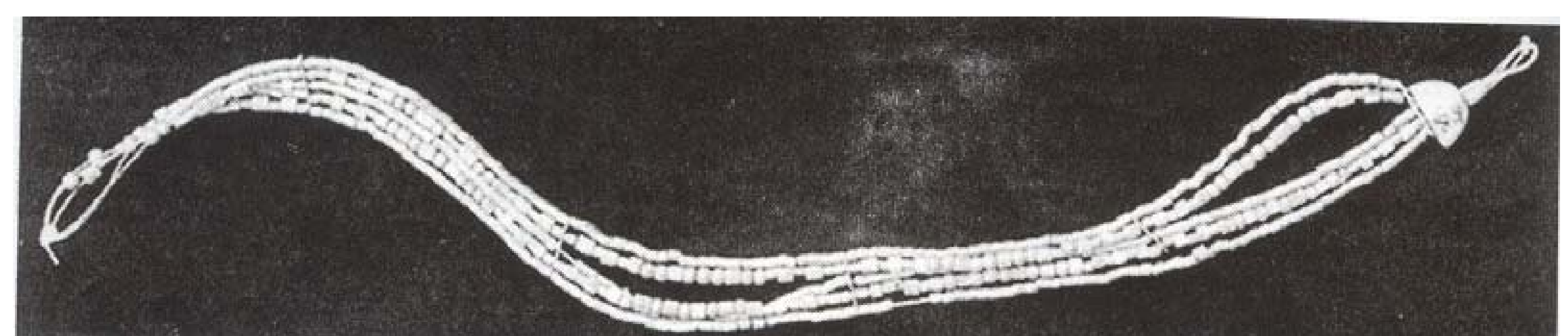
ready. This paint was applied to a carnelian stone using a reed pen. The painted stone was then allowed to dry, first in the hand, then by placing it on a metal plate over a charcoal fire. When fully dry, the carnelian was covered with live charcoal and the fire fanned for about five minutes. The piece was then removed from the hearth and allowed to cool slowly for about 10 minutes under an inverted cup, at which point the craftsman rubbed his piece of carnelian briskly with a rag and handed it over for inspection. “It was perfect”, says Mackay (4).

Steatile and Steatite Based Crafts: The term 'steatite' or 'soapstone' in archaeology of the subcontinent indicates various types of soft rocks which appear to be rather common both in the metamorphic belt of Baluchistan, and the Aravalli mountain range. Apparently, the commercial label may be applied to rocks containing talc (magnesium Harappan crafts. Harappan craftsmen were able to make steatite ornaments by complex manufacturing techniques including carving, glazing, painting, powdering, mixing the powder into an artificial paste and firing. It is well known that talc stands high temperatures without much chemical change, and undergoes the first transformations somewhere around 1000 degree centigrade, to change into enstatite and cristobalite as the temperature approaches 1200^{o} C. As a mat

ter of fact, the properties of talc as a very

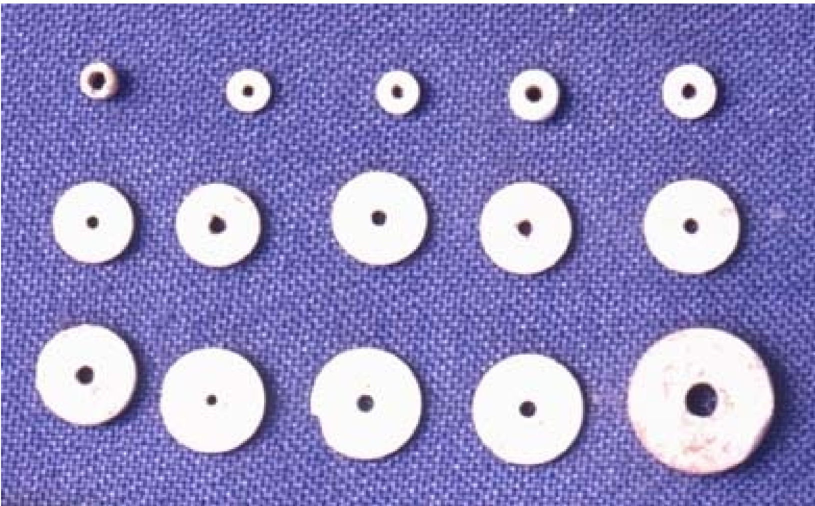
efficient natural refractory have been universally appreciated in different times and different cultures.

The earliest bead workshop we know from the prehistory of Pakistan, in fact the prehis
tory of whole South Asia, is a disc-bead manufactur
ing area excavated at Mehrgarh and dating to the



fifth millennium BC (6). At this site, steatite beads Necklace made with five strands of tiny beads of steatite, interspersed with those of gold and

faience, from HR area of Mohenjodaro (after Kenoyer)

Some representative micro– and wafer-beads beads from the

convincingly techniques used by ancient Harappans.

As far as archaeological evidence is concerned, there are indications for both possibilities. While on one hand, the steatite blanks of very small size have been discovered, on the other hand one has been able to see striation along the length of the

Some representative micro– and wafer-beads beads from
Indus Valley sites bead which indicates an **the Indus Valley sites**

extrusion process. It is
surmised that disc
beads
made

were manufactured besides shell discs, and the two were probably types were probably strung together in contrastingindividually by
drilling
blanks,
patterns. An analysis of samples identified this rock the steatite as composed of talc and calcite. The composition of grinding onthis rock with those employed elsewhere in the Inhard surfaces and then
420 heat treated to get whiledus Valley in later times is not known. The minera
logical
variability of
and
increased
these rocks in Pakistan is
color

hardness. The so-called probably very high and it will take a lot of work be



micro-beads were most fore mineralogical or chemical groups could be de
fined and the source areas of specific rocks singledBlanks with drilled holes

likely produced through
out.extrusion processan *Steatite Beads:* Vidale reports that during the
and the beads then heated to enhance color and hardness. Research has shown that the
7th millennium BC, beads made from talcose rocks
beads were made from talcose steatite. They were cut before they were hardened by become progressively smaller in size; this is abaking. Their faceted surfaces and the striation marks along their length indicate that
trend, which continues until the 3rd millennium BC.
they were produced by squeezing a compound under pressure through an aperture and this compound appears to have been a paste form. The aperture is a compounded device
(Vidale uses the terms "talc" or "talcose" and "stea
wherein a wire is inserted in the middle of the hole so that the extrudate emerges from

that disc were probably individually by the steatite grinding on

and increased ancient Harappans.
As far as archaeological

evidence is concerned, there are indications for
tite" interchangeably.) pyrotechnological treatmentboth possibilities. While of Mohenjo-daro Vidale (9) found perforated blanks, of talcose rocks begins during the 6th millennium on one hand, the steatite square in section, which could represent unfinished BC, then becomes more and more common, culmidisc-beads, square in shape. Therefore, it is possinating at the beginning of the 4th millennium BCblanks of very small size ble that disc-beads were manufactured by shaping when more than 90 per cent of the steatite beads have been discovered, onlong cylindrical blanks, perforating the blanks, and from Mehrgarh are fired white. The amount of talc the other hand one has finally separating the thin disks with a very fine working debris at the Indus sites becomes massivebeen able to see striation copper-bronze saw. Disc-beads were then fired at a and data from the activity area of Mehrgarh (5thalong the length of the relatively high temperature. Vidale has recon

Indus Valley sites bead which indicates an

structed the various stages of the manu

facturing sequence by microscopic observation of the manufacturing traces, experimental replicas and scanning electron microscopic (SEM) observation of both archaeogical and experimental samples (7,8,9).

Microbeads and Wafer-beads: Another type of beads very common in Harappan and Early Harappan contexts are the socalled 'paste' or micro beads. They resemble disc-beads in their color and surface features, but they are thicker, with regular short cylindrical body and an equally even, cylindrical hole. They often show along the edges coarse cutting

marks suggesting that these beads too were somehow carelessly sawn out of long cylindrical blanks.

Blanks with drilled holes

Blanks with drilled holes

process

and the beads then heated to enhance color and hardness. Research has shown that the
beads were made from talcose steatite. They were cut before they were hardened by millennium BC) are sufficient to suggest the possi baking. Their faceted surfaces and the striation marks along their length indicate that ble presence of apprentices.The application of blue

they were produced by squeezing a compound under pressure through an aperture and green glazes to steatite beads also begins in the 4th millennium BC. At the beginning of the 3rd millen this compound appears to have been a paste form. The aperture is a compounded device nium BC, artificial materials such as talc paste,

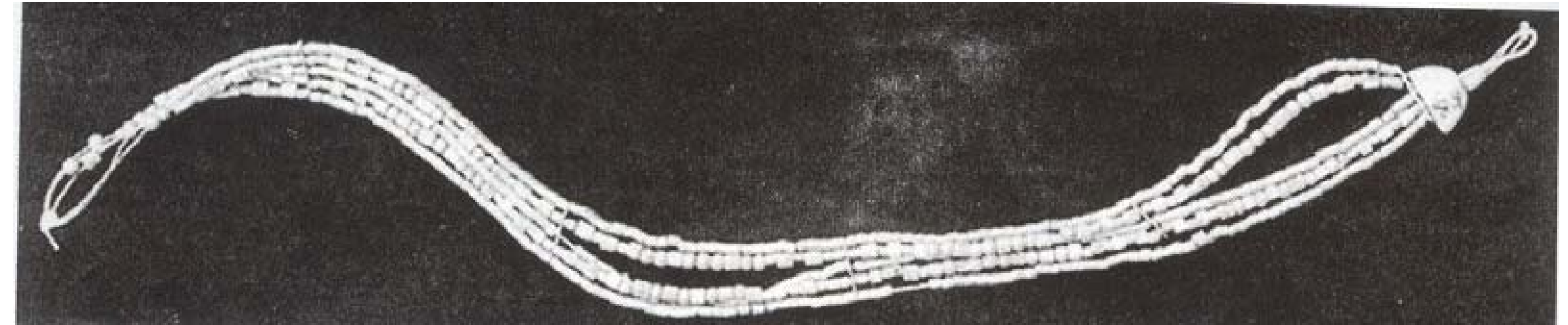
wherein a wire is inserted in the middle of the hole so that the extrudate emerges from steatite-faience and siliceous faience are introduced in the Indus bead repertory. The talc powder resulting from bead cutting is recycled as talc paste beads and this new technology culminates in the second-half of the 3rd millennium BC with the invention of the famous Harappan micro-beads. Steatite disc beads are the most distinctive

and ubiquitous artifacts of the Early Indus period.

They are very small, measuring one to three millimeters in length and one millimeter in external diameter. The diameter of the circular perforation at the center is one-half millimeter. In the case of

wafer-beads, the external diameter is about four to eight time the thickness. Noting their minute form, Mackay observed that they indicated craftsmanship of the highest quality, combined with extraordinarily good eyesight. They are hard: six to seven on the Moh's Scale. When cleaned in dilute hydrochloric acid, they become spotless white, immaculate and beautiful to behold. To the naked eye, they all look

alike, uniform and regular in their cylindrical shape.



Necklace made with five strands of tiny beads of steatite, interspersed with those of gold and
Necklace made with five strands of tiny beads of steatite, interspersed with those of gold and faience, from HR area of Mohenjodaro (*Kenoyer*)
faience, from HR area of Mohenjodaro (after Kenoyer)

Basing himself upon the discovery at Chanhu-daro of a concentration of thin, perforated plates of dark steatite, Mackay thought that the manufacturing sequence had to include the shaping of the sheets, perforation, firing/hardening and then rounding. Vidale has observed a square perforated blank whitened by firing that would partially support his reconstruction (10) Moreover, in at least two areas

421 Twisted strands of several strings of these fine

convincingly thebeads would undoubtedly make extremely attractive

necklaces. White microbeads have been recovered

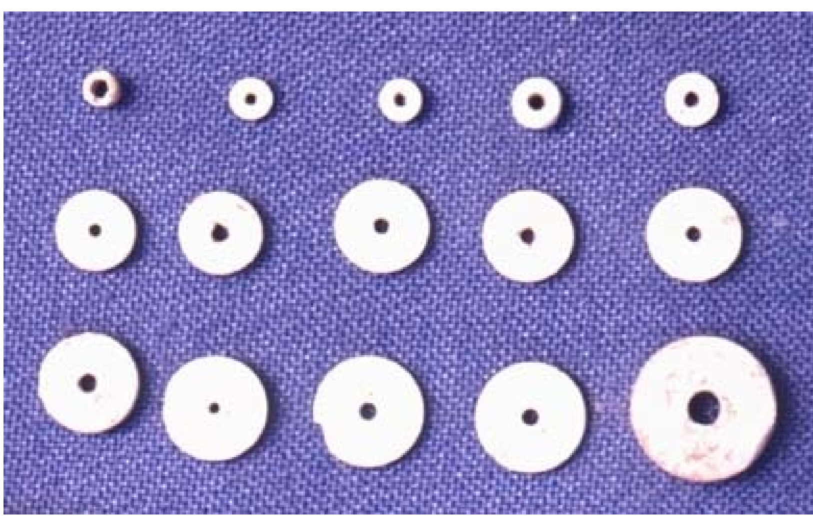
techniques used by the

in the excavations at Harappa, Chanhu-daro, Kali

bangan, Lothal, Gola Dharo.ancient Harappans.

Some scholars suggest that the micro-beads were made individually by delicate

As far as archaeological

drilling and grinding, while others propose that they were made

evidence is concerned, there are indications for both possibilities. While on one hand, the steatite

from a steatite paste that was extruded like a hollow noodle and then cut into short segments. Even today, it is difficult to make beads of this size, and no one has been able to replicate convincingly the techniques used by the ancient Harappans. All inactions, therefore, point to an extrusion process convincingly elucidated by Mackay (4).

Mackay (4,9) hypothesized that some 'artificial' steatite 'paste' was the base material for pro Miscellaneous Crafts !form slices. After careful drying, these slices are

on the *kirar*duction of Harappan microbeads. This suggestion and rubbed the whole carefully together to a semi-liquid mass. Then thethen baked to give them hardness. It is a simple

was confirmed by Hegde and his colleagues (10),
process but still a laborious, painstaking, unhurried

craftsman strained this mixture through a piece of linen into a large empty mussel shell,when they analyzed some microbeads found in the job. Surprisingly, it is the same method that is

so-called pot-hoard found below the floor of a circu

and the ‘paint’ was ready. This paint was applied to a carnelian stone using a reed pen.

thought to be in use at Mehrgarh in the Early Indus

lar house at Zekhda in Gujarat. Chemical analysis The painted stone was then allowed to dry, first in the hand, then by placing it on atimes. Thus, although the

availability of microbeads

showed that the beads were made of silica and
increased manifold in the Harappan times, their de

metal plate over a charcoal fire. When fully dry, the carnelian was covered with live magnesia, with traces of alumina and iron oxide. velopment and method of production most likely go

Analyzed with X-ray diffraction, the beads turned

charcoal and the fire fanned for about five minutes. The piece was then removed from

to an earlier times, before the urban phase of the

out to be composed of cristobalite, the high temthe hearth and allowed to cool slowly for about 10 minutes under an inverted cup, at

perature modification of quartz (stable from 1470 to **Raw Material:** *Carnelian, Agate, Jasper, etc.***:**

about 1700 °C and enstatite (anhydrous magne which point the craftsman rubbed his piece of carnelian briskly with a rag and handed it over for inspection. "It was perfect", says Mackay.

The source areas for carnelian, chalcedony, agate,
and jasper are more varied than for chert and lapis



Hair ornament made from tiny steatite mi
Hair ornament made from tiny stea
crobeads, found beneath the skull of a male
tite microbeads, found beneath the *Kenoyer***)**
skull of a male buried in the Harapan
cemetery (after Kenoyer)
lazuli. The most valued source today is in Gujarat,

Microbeads and Wafer-beads: Among the fine

from which jewelry of the highest quality is pro

quality ornaments of the Harappan Civilization are duced; however, there are numerous other resource

zones. Agate and jasper are erosion products from

also the microbeads and wafer-beads. As relics,

volcanic formations that appear in the form of peb

microbeads beads are of unique value to students of

bles in alluvial beds in the Upper Indus and else

Harappan

where in larger outcrops. Carnelian is an agate

technology. They are very small,

variant that can be transformed from a red-brownish

measuring one to three millimeters in length and

color to red by firing the stone in containers. In con

trast to the prepared chert cores andone millimeter in external diameter. The diameter blades
of the circular perforation at the center is one-half shipped from the Rohri mine, the carnelian discov

ered at places like Chanhu-daro arrived unmodified

millimeter. In the case of wafer-beads, the external

"without any preliminary stage of reduction" (11).

diameter is about four to eight time the thickness.

Lapis Laqzuli: A lot has been written on lapis

Noting their minute form, Mackay observed that Lazuli trade. An exceptionally beautiful type of blue

stone, Lapis lazuli was one of the principal materials

they indicated craftsmanship of the highest quality,

procured through early trade networks. It was one

combined with extraordinarily good eyesight. They

of the most highly prized raw materials in the an

are hard: six to seven on the Moh's Scale. Whencient world, often used in conjunction with gold and

other precious materials to create exceptional or

cleaned in dilute hydrochloric acid, they become

naments and works of art. For a long time it was

spotless white, immaculate and beautiful to behold.

thought that the Sar-i-Sang and other mines at Ba

To the naked eye, they all look alike, uniform anddakshan in Afghanistan were the sole source of the

lapis lazuli known in antiquity to the inhabitants of

regular in their cylindrical shape. Twisted strands

the great swathe of territory from Egypt to Pakistan.

**of several strings of these fine
beads would**

buried in the Harapan cemetery (Recently, however, a deposit of visually similar and chemically related material was discovered in the sium silicate). Both cristobalite and enstatite are

undoubtedly makeknown as transformation products of talc affected

by pyrotechnological treatment. Micro extremely attractive necklaces. White

morphological analysis of manufacturing traces at

microbeads have been recovered in the optical microscope showed cutting marks and
the excavations

spiral oriented traces which suggested a ceramic

at Harappa,

manufacturing process through extrusion. The con

Chanhu-daro,
Kalibangan, Lothal,

clusion of Hegde and his colleagues is that the base

Gola Dharo. material for the microbeads was powdered steatite

treated in plastic form from a special extruding de

vice and then firedSome scholars suggest that the
micro-beads wereObservations have shown that the beads were cut before they were hardened by baking.made
individually by delicate drilling and

Their faceted surfaces and the striation marks along
Chagai Hills, south of Seistan in western Baluchistan. Scientific analyses of lapis lazuli from ancient sites are rare, and so the source of the material from which ancient lapis lazuli objects were made is generally unknown. One exception is the material from Shahr-i Sokhta, not far from Chagai. Analyses have shown this to include lapis derived from three sources: Chaghai, Badakshan, and a more distant source in the Pamirs, less than a third of the samples that were analyzed coming from Chagai. Shahr-i-Sokhta had a major role as a break-of-bulk center for the lapis trade: There raw nodules were worked to remove the cortex (outer rind) and impurities, and the lapis was prepared for export, either as their length indicate that they were produced by squeezing a compound under pressure through an aperture and this compound appears to have been a paste form. The aperture is a compounded device wherein a wire is inserted in the middle of the hole so that the extrudate emerges from the aperture as a tube. As the tube of the paste emerges under pressure, a craftsman regularly cuts the tube in uni

grinding, while others propose that they were made from a steatite paste that was extruded like a hollow
noodle and then cut into short



These tiny steatite beads were found in the Harappan cemetery and come from an elaborate hair ornament

combined with extraordinarily good eyesight. They
are hard: six to seven on the Moh's Scale. When
cleaned in dilute hydrochloric acid, they become

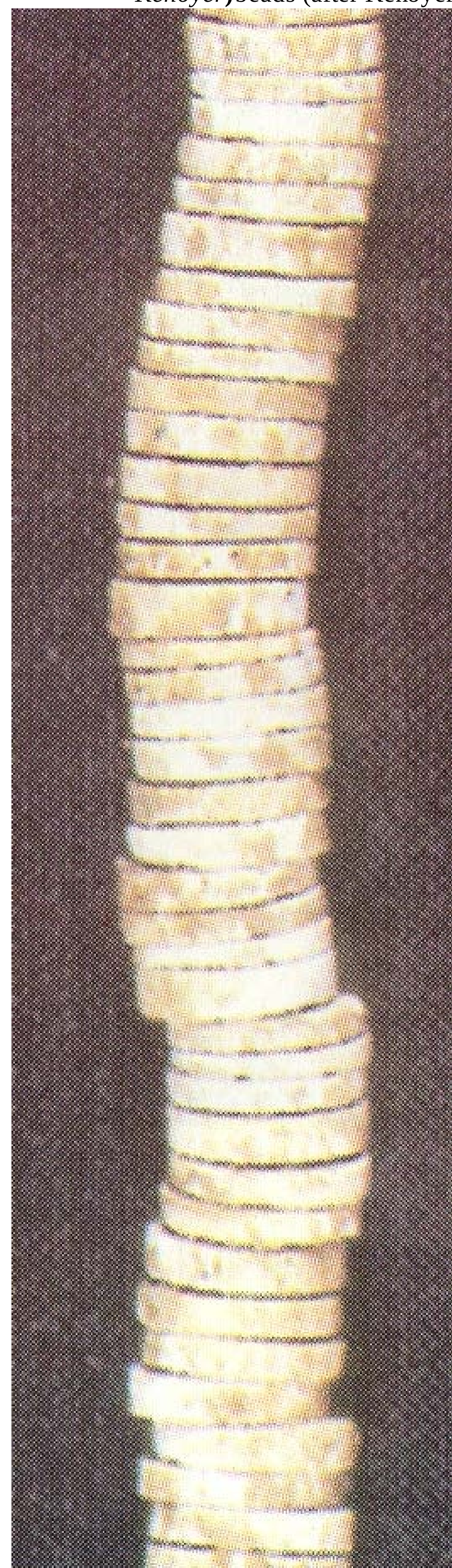
spotless white, immaculate and beautiful to behold. pure clean nodules or as finished items such as
To the naked eye, they all look alike, uniform and beads. It seems strange that Shahr-i-Sokhta did not
regular in their cylindrical shape. Twisted strands
confine its procurement of lapis to that from the of several strings of these fine beads would
extremely
at Harappa,
that the made
!



These tiny steatite micro-beads were found in the
These tiny steatite beads were found in the Harappan
Harappan cemetery and come from an elaborate hair
cemetery and come from an elaborate hair ornament
ornament worn by a male individual. Each bead is less
worn by a male individual. Each bead is less than .01
than .01 cm long and less than .01 cm diameter. A hu
cm long and less than .01 cm diameter. A human hair **man hair is shown to give an idea of the minute size of**

is shown to give an idea of the minute size of these

these beads (*Kenoyer***)**beads (after Kenoyer)



A string of disc-bead.

A string of disc-bead. No

Notice the extremely

tice the extremely uniform uniform size**size**

nearby Chagai hills rather than exploiting more dis- tant sources. It may be that the Chagai hills source
during
was discovered

the third millennium and that its exploitation was therefore a recent addition to the longestablished trade in lapis from Badakshan. Shahr-iSokhta was on a major route to Afghanistan and Turkmenia, and it had very close cultural ties with the inhabitants of southeast Turkmenia who exploited the Badakshan lapis source and from whom the people of Shahr-i-Sokhta obtained large quantities of turquoise.

Steatite: Law's analytical studies (12) of resource and procurement zones indicate that four potential sources of steatite were in use, though there were shifts over

time. At Harappa, in the Pre-urban period, steatite was procured at source areas to the north of Harappa in the STONE ARTIFACTS

Harappan Civilization is said to be a Bronze Age civilization. If by Bronze Age we mean the time period when the use of copper and bronze became wide-spread, then this characterization is not wholly true: copper and bronze were available and they were in use. The use of metal was, however, not that common and stone was still employed for making tools and weapons as well as other artifacts of daily use or adoration. The Indus people are not particularly known for their stone sculpture and elaborate vases of semi-precious stones but they are known for a host of other artifacts: all of them made of stone. Stone tools were as important for the Hardpans as they were for their predecessors.

As Bridget Allchin puts it, the immediate ancestors of the Harappan Civilization are to be sought in regions around the Indus plains, and especially to the west and the northwest, where stone was, and is, plentiful. They were conditioned to using it for tools and weapons, in a manner inherited from their Paleolithic forbearers. In many other cases, such as the Kot Dijians, they were also in the habit of employing stone for building house walls and footings, as well as massive town walls. Other used it for building irrigation bunds and channels, while still others prized stones of special textures and colors to adore themselves and their deities. Some stones served them for their hardness and durability, some other for their ease of carving and shaping, and still other for their beauty and appearance. Thus, stone was a versatile raw material and some communities were rich in this resource while other rather poor.

Stone Tools: A high degree of technological sophistication was already evident among the Early Harappan people in making simple as well as composite tools from stone during the 4th and 5th millennium BC. They included not only the tools of daily use but also the micro-drills and polishers for working precious stones into highly valuable beads and other items of luxury. The knife-like chert blades became common and polished chisels and axes were known throughout the various regional cultures. Studies of the stone industries from settlements of the Harappan period show a distinct and probably rapid development and convergence from the more varied, individual assemblages recorded at Early Harappan. It is, however, unfortunate that enough attention has not been paid to this aspect of the Harappan Civilization; the focus has generally remained on copper and other metals.

The Rohri or Sukkur hills of northern Sindh were a major source of the gray flint or chert out of

which long and short ’knives’ were made. At the

423 Khyber and Hazara in the Pashtun country. Later in the Urban period, while steatite continued to be obtained from the north, some other sources were also tapped.
beginning of the Harappan period, the assemblages from urban sites the range of stone artifacts becoming rather narrow. This abrupt change limited the stone tools almost exclusively to plain un-retouched blades. However, surprisingly, extensive range of stone tools went on being made at contemporary,

'non-urban sites. This could probably be explained for the relatively easier access to copper in the cities. Taken together, throughout the Mature Indus period a considerable quantity of very fine stone

of the


The surface of a workshop in Rohri Hills,
The surface of a workshop in Rohri Hills, near Mohenjodaro. Three sub-conical cores are visible. These cores are
near Mohenjodaro. Three sub-conical
of a type typical for Harappan culture, both conical and
cores are visible. These cores are of a
elongated. The blades have been struck off with the pres

type typical for Harappan culture, both conical and elongated. The blades have blades continued to be made and used, although

been struck off with the pressure tech
only a very small proportion were trimmed or re
nique.
worked in any way. There is fairly conclusive evi
dence at Mohenjo-daro, that stone blades, or the cores from which they were struck, were trans

the beginning of the Harappan period,

ported to the cities from workshop sites located at

the assemblages from urban sites show the sources of supply many miles distant.

Thus,

there must have been a genuine need for these

the range of stone artifacts becoming

tools. Most of the stone-blade factories on these

rather narrow. This abrupt changehills were near the Indus, situated on both sides of

the river, suggesting that the finished goods were

limited the stone tools almost

sent by boat from here to Mohenjo-daro and other

exclusively to plain un-retouched

Recent research has highlighted the complex

blades. However, surprisingly extensive

and organized character of the operation behind the

range of stone tools went on being 424made at contemporary, non-urban sites. This could probably be explained for the relatively easier access to copper in

manufacture of large chert blades found at many Harappan sites in the Indus plains. For instance, the study of the assemblage at one of Rohri hill sites identified two working stages: one connected with the production of blades more than 8 cm long and the other with the residue of cores abandoned in the earlier operations for the preparation of smaller sized bladelets. In the first case, the estimate is that at least 2000 blades were exported from the site.Miscellaneous Crafts

Another point which emerges is the possibility of using a metal point for pressing blades off theand other items of luxury. The knife-like chert blades became common and polished body of cores, along with the usual pressure-flaking chisels and axes were known throughout the various regional cultures. Studies of the

technique which does not involve the use of metal
stone industries from settlements of the
points and which had been the technological base

Harappan period show a distinct and probably
for blade production in the Early Harappan period.
rapid development and convergence from the
Longer and more regular blade-core and blades
could have been cut out of stone by use of copper
more varied, individual assemblages recorded at
Earlytools only which was not possible in earlier Neolithic
or the Early Harappan times.Indus. It is, however, unfortunate that
enough attention has not been paid to this aspect
Lithic flake and core tools occurred in abun
of the Harappan Civilization; the focus has
dance in most of the houses of Mohenjo-daro, and
generally remained on copper and other metals.
in this context it is logical to surmise that at least
secondary preparations of specific blade-based
The Rohri or Sukkur hills of northern Sindh

tools took place in individual households, including
some blade production. Cherts not brought from thewere a major source of the gray flint or chert out
Rohri hills, were also used at Harappan sites, and in

of which long and short 'knives' were made. At



The surface of a workshop in Rohri Hills, near Mohenjodaro. Three sub-conical cores are visible. These cores are of a type typical for Harappan culture, both

conical and elongated. The blades have been struck off with the pressure tech

Some of the narrow bladelets discarded by
Some of the narrow bladelets discarded by Harappan flint-knappers are only 2-3 millimeters wide. Bladelets
Harappan flint-knappers are only 2-3 millimeters
were later retouched into instruments in the Harappan
wide. Bladelets were later retouched into instru
cities. They were often shaped into microdrills for piercments in the Indus Valley cities. They were often **ing stone and shell beads.**
shaped into microdrills for piercing stone and shell beads.

the beginning of the Harappan period, the assemblages from urban sites show the range of stone artifacts becoming rather narrow. This abrupt change limited the stone tools almost exclusively to blades. However, surprisingly extensive range of stone tools went on being made at contemporary, non-urban sites. This could probably be explained for the relatively easier access to copper in the cities. Taken together, throughout the Mature Indus period a considerable quantity of very continued to

adzes would have been used not only in agriculture but for felling and splicing trees and their trunks, for making rafters for ceilings of houses, for boats and for carts. While a large number of stone querns, grinding stones and whet stones have been found,

were

no ground stone axe or adze is reported from Mohenjo-daro or anywhere else, except two or three at Harappa. True, ground stone tools are more likely to have been both made and utilized in

the countryside than in a house in Mohernjo-daro,
and would therefore be under-represented in town some blade production. Cherts not brought from the Rohri hills, were also used at
debris. If ground stone tools had been in regular

Harappan sites, and in such cases the blades are smaller. There is also proof of the



Miscellaneous Crafts presence of a specialized miniature-blade preparation at Mohenjodaro. At Lothal, the!use we would have found a sample of them at smaller Harappan sites.excavator's inference is that the 'thousands of parallel-sided blades' found at the site

although only
a very
small proportion were
served primarily as domestic knives. He admits the possibility of some of these blades **Chert Weights:** An interesting stone-crafthaving been imported from the Rohri hills.
trimmed or reworked in any way. There is fairly
and far-reaching in consequence was the making of The Neolithic and its later developmental stages presupposes the extensive use of
conclusive evidence at Mohenjodaro, that stone
polished or ground stone tools. However, these are almost totally absent in the Harappan weight measures in the form of chert cubes. These remains and this absence is puzzling. The ground stone axes and adzes would have been
have been found in large numbers at Mohenjo-daro,
blades, or the cores from which they
were

used not only in agriculture but for felling and splicing trees and their trunks, for making rafters for ceilings of houses, for boats and for carts. While very large numberHarappa, and several other places as far as the struck, were transported to the cities from of stone querns, grinding stones and whet stones have been found, no ground stone axe Persian Gulf. Excluding a few fractional pieces, and

workshop sites located at the sources of supply
or adze is reported from Mohenjodaro or anywhere else, except two or three at Harappa. counting
from
the
most
common unit of
13.63
True, ground stone tools are more likely to have been both made and utilized in the
many miles distant. Thus, there must have been
countryside than in a house in Mohernjodaro, and would therefore be under-represented grams, the scale runs in the ratio of 1,2,4, 8, 16, 32, in town debris. If ground stone tools had been in regular use we would have found a
64, 160, 200, 320, 640, 1600, while the fractions are

a genuine need for these tools. Most of the stone sample of them at one or the other Harappan sites. Therefore, it could be argued that

Polished stone tools from Harappan 1/16, 1/8, 1⁄4 and 1⁄2.paucity of metal tools in Harappan mounds is a factor of metal re-use, but a paucity of

-blade factories on these hills were near the stone tools would indicate instead that stone axes were not in frequent use.

Indus, situated on bothperiod. Surprisingly, the Harappan period

ingly, the Harappan period is not as rich in polished

is not as rich in polished stone tools as

suggesting that the finished goods were sent by

sides of the river,

most of the other Bronze Age civilizations

have been

boat from here to Mohenjodaro and other places. Recent research has highlighted the complex and organized character of the operation behind the manufacture of large chert blades found at many Harappan sites in the Indus plains. For



Examples of ground stone tools. Such tools are typical of

Examples of ground stone tools. Such tools are

the Neolithic in other parts of the ancient world but they

typical of the Neolithic in other parts of the an

are relatively rare in the Indus Valley.

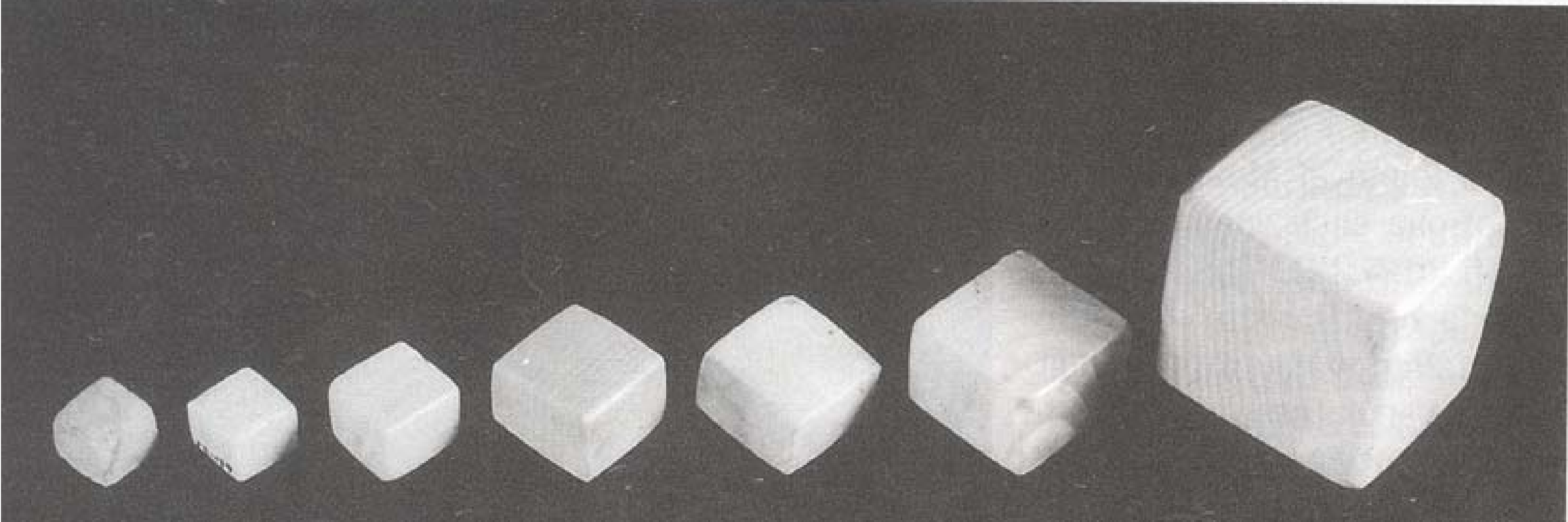
cient world but they are relatively rare in the In

dus Valley.

such cases the blades are smaller. There is also

proof of the presence of a specialized miniature





Cubical chert weights from Allahdino (after Kenoyer) **Cubical chert weights from Allahdino (** *Kenoyer***)**Polished stone tools from Harappan

Chert Weights : An interesting stone-craft and far-reaching in consequence was the

period. Surprisingly, the Harappan period**!** making of weight measures in the form of chert cubes. These have been found in large

is not as rich in polished stone tools as

numbers at Mohenjodaro, Harappa, and several other places as far as the Persian Gulf. Excluding a few fractional pieces, and counting from the most common unit of 13.63 grams, the scale runs in the ratio of 1,2,4, 8, 16, 32, 64, 160, 200, 320, 640, 1600, while the fractions are 1/16, 1/8, !have been

These weight measures are, with hardly an exception, uniform in shape: a rectangular block for large weights and a cube in the smaller sizes. In the great majority of cases, these measures are of the same material – a hard chert. They are well finished with

boat from here to Mohenjodaro and

polished faces and occasionally with beveled edges. Stone weights have also been found

other places.

Recent research has highlighted the complex and organized character of the operation behind the manufacture of large chert blades found at many



Turncated spherical weights from Mohenjodaro (after Kenoyer) **Turncated spherical weights from Mohenjo-daro (***Ke*Harappan sites in the Indus plains. For *noyer***)**
instance, the study of the assemblage at one of Rohri hill sites identified two working in Mesopotamia but the Harappan weights are made with much greater accuracy and
blade preparation at Mohenjo-daro. At Lothal, the consistency than those of Susa in Iraq. Every excavated site of the Indus Civilization has
excavator'sstages: one connected with the production of blades more than 8 cm long and the other turned up such rectangular or cubical chert weights. Heavier weights have only been
parallel-sided blades' found at the site served prifound at major trading centers such as Chanhgu-daro or at the largest cities of These weight measures are, with hardly an
with the residue of cores abandoned in the earlier operations for the preparation of exception, uniform in shape: a rectangular block for marily as domestic knives. He admits the possibility of the rural settlements.
smaller-sized bladelets. In the first case, the estimate is that at least 2000 blades werelarge weights and a cube in the smaller sizes. In the of some of these blades having been imported from
the Rohri hills.exported from the site.
The Neolithic and its later developmental
Cubical form, although more common, was not the only
great majority of cases, these measures are of theform: many sites have truncated spherical weights that same material – a hard chert. They are well finishedconform to the same weight system. Usually made from
agate or colored jaspers, these weights may reflect a
Another point which emerges is the possibility of using a metal point for pressing blades manufacture or perhaps a
stages presupposes the extensive use of polished edges. Stone weights have also been found inor ground stone tools. However, these are almostoff the body of cores, along with the usual pressure-flaking technique which does not Mesopotamia but the Harappan weights are made
totally absent in the Harappan remains and this abinvolve the use of metal points and which had been the technological base for blade ringstones, carefully sculptured in the form of a doughnut
sence

is
puzzling. The
ground
stone
axes
and
with much greater accuracy and consistency than production in the Early Indus period. Longer and more regular blade-core and blades Similarly shaped stones are also found in western Asia
could have been cut out of stone by use of copper tools only which was not possible in425
earlier Neolithic or the Early Indus times



A typical Harappan ring stone Such stones have been found in various sizes at Mohenjodaro, Harappa, and Lothal

where they occur at sites of various periods and are referred to as mace heads. This identification was borrowed by Marshall with respect to those found at Mohenjodaro and elsewhere, and was widely accepted by later archaeologists. In southern Africa such stones are

Page 408Lithic flake and core tools occurred in abundance in most of the houses of
use that has been considered, especially for their smaller versions, is as sling missiles. Their usage as a bola stone has also been considered. The bolas stone (or stones), being Harappan Civilization - The Material Culture
attached to a long cord, is recoverable and therefore can be used again and again. This kind of repeated use would explain the very battered state of many ring stones found in



A typical Harappan ring

those of Susa in Iraq. Every excavated site of the Indus Civilization has turned up such rectangular or cubical chert weights. Heavier weights have only
been
found
at
major
trading
centers
such
as
Turncated spherical weights from Mohenjodaro (after Kenoyer)
lines. The games were

Chanhgu-daro or at the largest cities of Mohenjo daro and Harappa, but complete sets of the smaller weights are found at most of the rural settlements.

Cubical form, although more common, was probably driven with a **Games and Game Pieces:** throw of dice, which board carved onto bricks or made of could be as simple as fired clay have been found at most *cowri* shell and



as

in Mesopotamia but the Harappan weights are made with much greater accuracy and

Another set of game pieces Indus sites, notconsistency than those of Susa in Iraq. Every excavated site of the Indus Civilization has spherical weights that conform to the same weight dice or finely carved turned up such rectangular or cubical chert weights. Heavier weights have only beenstandardized shape or form. Most

system. Usually made from agate or colored jas brings all his pieces safely 'home'. The recovered

gaming pieces are made in stone and terracotta but boards have a large square divided pers, these weights may reflect a regional style of found at major trading centers such as Chanhgu-daro or at the largest cities of by vertical, horizontal andweight manufac.ure or perhaps a competing class The shapes are varied, mostly in conical or

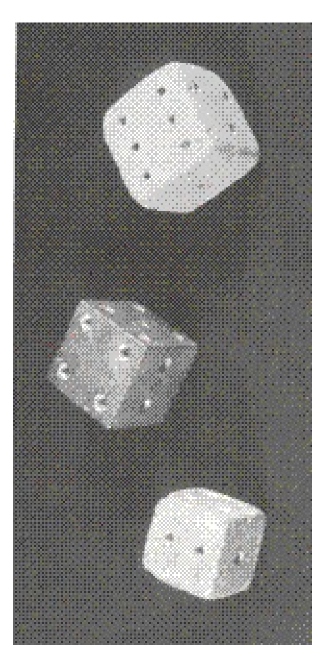
Dice made from terra Mohenjodaro and Harappa, but complete sets of the smaller weights are found at most of merchants spherical shapes with distinctive designs. of the rural settlements.

cotta and stone were
A large number of small and
Miscellaneous Stone Objects: Stone objects of
probably used in
Ring-stones: many other kinds were also used in the Haraopan

cities and probably imported from the factory sites

sometimes diagonal games were probably driven with a throw of dice, which could be as

Cubical form, although more common, was not the only simple as cori such as querns, bead grinding stones, pallet stones,form: many sites have truncated spherical weights that complicated as today.etc. At Chanhu-daro, in a bead-making workshop, Cubical dice finely carved ivory rods with circles conform to the same weight system. Usually made from A typical Harapin cornelian and agate beads. On the other hand, incised on each face. Dice madeagate or colored jaspers,times, made pan ringthese weights may reflect afrom terracotta they had been in the Neolithic times. Other stone



stone Such stones in stone as well as manufacture or perhaps a probably used in games of chance have been found inregional style of weighthas been

A chess-like game, akin to *Chowtissi* **Dices, made of chert, from** very common in **various sizes at** found at Harappa. A

competing class of merchants

Mohenjodaro,

Ring-stones: A large number

similar to those played throughout India and some parts of Pakistan
objects
of

artistic and
Harappa probably the region today.

of religious small significance are rare similar to one used in modern times, pieces of sculpture. The and use of large Lothal ringstones, carefully sculptured in the form of a doughnutmade in stone as well as terracotta,
constructional purposes (e.g. door has been found at Harappa. A few have been found at Mohenjodaro, Harappa, and Lothal. bone and ivory rods with lines and been in evidence at Harappa and
Similarly shaped stones are also found in western Asia circles marked along their length



sites are situated on an alluvial have been recovered from Harappa where they occur at sites of various periods and are
large ringstones, carefully sculptured in the form of referred to as mace heads.
This identification was procured from some distance. and Mohenjodaro. They are thought

stone Such stones have
at
were probably used to grind grain and hard-to-digest
Flint arrowheads are very rare at a

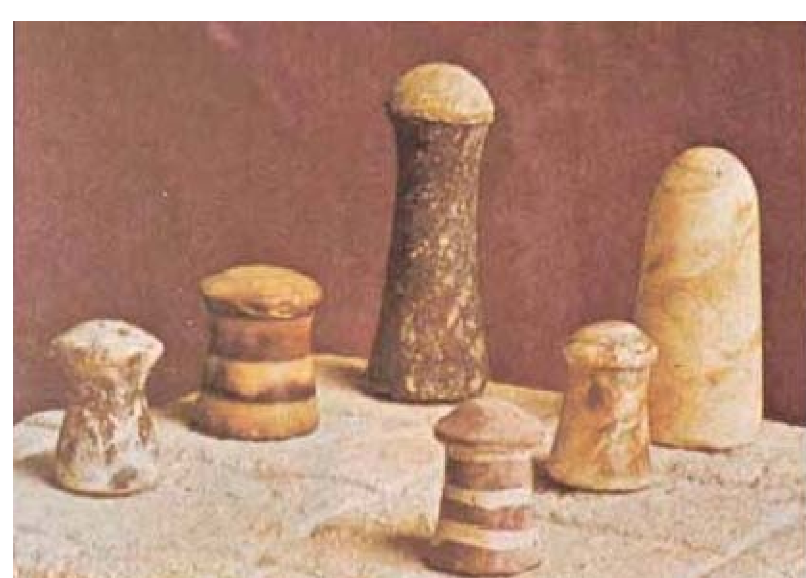
doughnut have been found borrowed by Marshall with respect to those found at of as a form of dice also. Large bar

been found in various sizes shaped dice Harappa, and Lothal. Similarly shaped stones are kitchens of Pakistan and more so in India there is a solitary example at

at Mohenjodaro, Harappa, Pakistan and northern India to play also found in western Asia where they occur at sites Mohenjodaro and elsewhere, and was widely accepted by

of various periods and are referred to as mace
and Lothal
heads. This identification was borrowed by Marshall
with respect to those found at Mohenjo-daro and

later archaeologists. In southern Africa such stones arethe game of *pacheesi*



which may date as early as 1500 BC. In this game two to four players square divided by verthese types of assemblage. Larger ringstones have also been found. They are certainly tical, horizontal andarchitectural elements, as discussed in Chapter 10, for supporting sometimes diagonal

elsewhere, and was widely accepted by later ar chaeologists. In southern Africa such stones are known to have been made and used as weights for digging sticks, and there is a certain amount of eth nographic evidence from India that points in the same direction. There is, however, no direct evi dence within the Indus Valley for either function. Other possible use that has been considered, espe cially for their smaller versions, is as sling missiles. Their usage as a bola stone has also been consid ered. The bolas stone (or stones), being attached to a long cord, is recoverable and therefore can be used again and again. This kind of repeated use would explain the very battered state of many ring stones found in these types of assemblage. Larger

ringstones have also been found. They are certainly architectural elements, as discussed in Chapter 13, for supporting wooden stake or column.

Games and Game Pieces: Gaming board carved onto bricks or made of fired clay have been found at most Indus sites, but there is no standard ized shape or form. Most boards have a large

Page 410Finely crafted and highly polished game pieces from move pieces **Finely crafted and highly polished game pieces from stone** stone !shaped board, Miscellaneous Crafts attacking each other until one player


Page 411

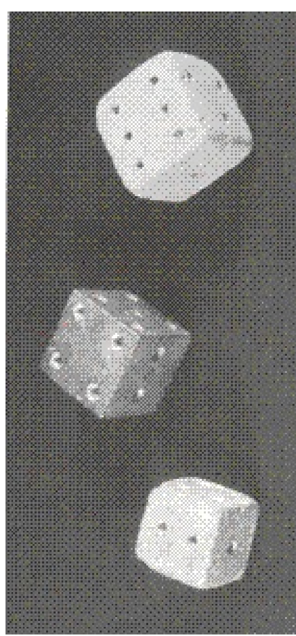
Another set of game pieces

brings all his pieces safely 'home'. The recovered few bone and ivory rods with lines and circles gaming pieces are made in stone and terracotta but

marked along their length have been recovered from Harappa and Mohenjo-daro. They are thoughtthey may as well have been made in wood also.

of as a form of dice also. Large bar-shaped dice are
The shapes are varied, mostly in conical or still used in Pakistan and northern India to play the spherical shapes with distinctive designs.

426 **Miscellaneous Stone Objects:** Stone objects of many other kinds were also used in the Haraopan cities and probably imported from the factory sites

along the Indus. These include utilitarian objects 

Unluckily, hardly any actual product of Indus

these types of assemblage. Larger ringstones have also been found. They are certainly

architectural elements, as discussed in Chapter 10, for supporting carpentry has survived, in contrast to what the dry

column.
Ancient Pakistan - An Archaeological History

soil has preserved at Shahr-i-Sokhta. However,

factory sites along the Indus. These include utilitar

there are clay and even bronze models, apparently

ian objects such as querns, bead grinding stones,

serving as toys, that enable us to say something pallet stones, etc. Stone mullers and querns contin

ued to be made as they had been in the Neolithic

about carpentry products. We have already referredtimes. The use of stone for very limited building and standardized shape or form. Mostdoor sockets andto the clay models of the plough somewhere in this

drain covers) has also been in evidence at Harappa

book and have reproduced a picture of one. Woodand Mohenjo-daro. Since both of these sites are handles were necessary

situated on an alluvial plain, these stones must

sometimes for manylines. copper tools, A cylindrical drinking vessel made of games were probably driven with aFlint arrowheads are very rare at Harappansoft stone with concave sides. The such as sickles, axes and adzes. But it is, perhaps,

throw of dice, which could be as sites: to our knowledge there is a solitary example

the wooden carts that call for closer attention. exterior surface is finely polished.

rowheads of the sort one finds in other Bronze Age
complicated
cultures. This is significant, considering that flint and

as cubical dice or This unique vessel probably was notThe numerous toy models found at Indus sites



bone artifacts have a higher rate of discard and thus

incised on each face. Dice made made at Mohenjodaro but was a better chance of being incorporated in the arbrought to the city by traders from from terracotta and suggest that there were perhaps three main forms of

stone were chaeological record than do bronze objects. Mar

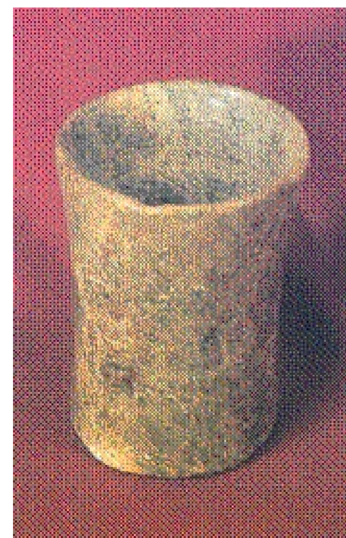
A chess-like game, akin to *Chowtissi* very common in these vehicles. First, and most common, a twoshall opined that ". . . that suggests the bow and Iran or from Afghanistan.

A chess-like game, akin to

Chowtissi
India and some parts of Pakistan
similar to those played throughout arrow could not have been a favorite weapon".

wheel cart with a broad frame, which was mainly the region today. An important raw material of what

Miscellaneous Crafts! **and some parts of Pakistan** Cubical dice
and no bone

Finely crafted and highly polished game pieces from

stone
for many copper tools, A cylindrical drinking vessel made of

similar to one used in modern times, made in stone as well as terracotta, has been found at Harappa. A few bone and ivory rods with lines and circles marked along their length have been recovered from Harappa and Mohenjodaro. They are thought of as a form of dice also. Large bar shaped dice are still used in

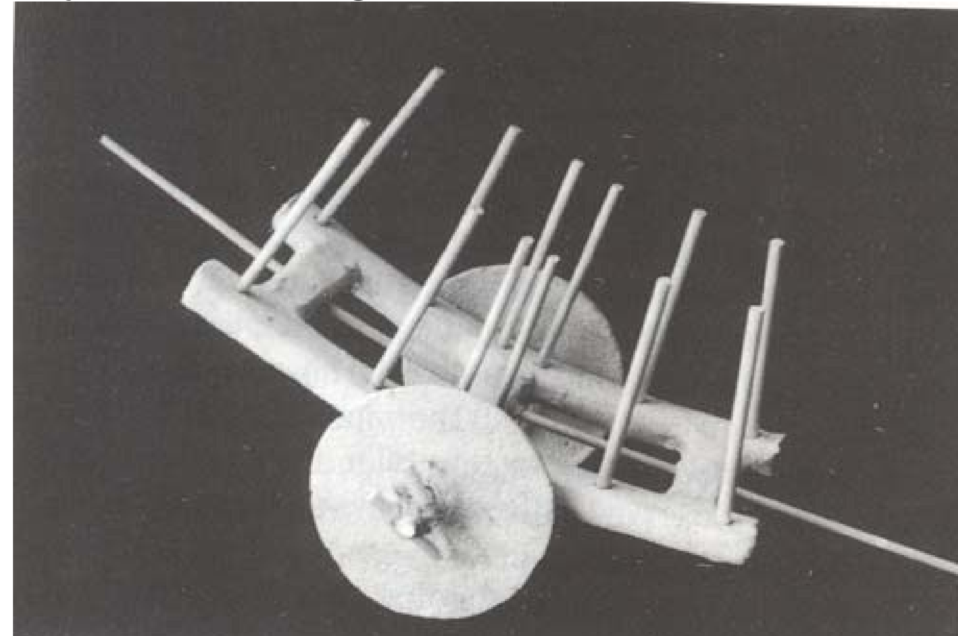
Pakistan and northern India to play the game of *pacheesi* or *chauparh*, which may date as early as 1500 BC. In this game two to four players move pieces around the cross shaped board, blocking and attacking each other until one player

meant for second, a four-wheel cart with a spoon-like protecting the occupant-driver; and, third, a light cart or chariot, of which

industry was wood. models

Chanhu-daro. The wheels in all However, these (spokeless), hubs, but generally

A cylindrical drinking ves



fact that the bronze models

soft stone with concave sides. The

sel made of soft stone with

exterior surface is finely polished.

concave sides. The exterior Page 411

This unique vessel probably was not

surface is finely polished.

brought to the city by traders from

This unique vessel proba

Iran or from Afghanistan.

bly was not made at

Mohenjo-daro but was

meant for goods'**brought to the city by trad**transport; second, a four-wheel cart with a

spoon-like ers from Iran frame
protecting the occupant-driver;

and, third, a light cart or chariot,

from the Mature Indus period (and the

A Terracotta model of oxcart from Naushahro. Building of such a vehicle must have

A Terracotta model of oxcart from Naushahro. Building of

needed a high degree of carpentry skill (*Kenoyer*)

such a vehicle must have needed a high degree of car
pentry skill (after Kenoyer)
preserved at the Late Indus colony at Daimabad, also show

wooden

game of *pacheesi* or *chauparh*, which may date as early as 1500 BC. In this game two to four players of which we have bronze the cross-shaped models move pieces around

from Harappa and
board, blocking and attacking each other until one
Chanhu-daro. The wheels in all player brings all his pieces safely ‘home’. The rethese models are solid
covered gaming pieces from Mature Harappan sites are made in stone and terracotta but they may as
fact that the bronze models
well have been made in wood also. The shapes are

from the Mature Indus period
varied, mostly in conical or spherical shapes with
(and the one apparently
distinctive designs.preserved at the Late Indus

Miscellaneous Stone Objects: Stone ob
colony at Daimabad, also show
jects of many other kinds were also used in the
spokeless wheels is decisive,
Haraopan cities and probably imported from the Page 413

may be called the Indus 'capital-goods' industry was spokeless wheels is decisive,
wood. Unluckily, hardly any actual product of Indus

carpentry has survived, in contrast to what the dry

soil has preserved at Shahr-i-Sokhta. However, there are clay and even bronze models, apparently serving as toys, that enable us to say something about carpentry products. We have already referred to the clay models of the plough somewhere in this book and have reproduced a picture of one. Several such clay models havebeen recovered from Mature Harappan sites. Wood handles were necessary for many copper tools, such as sickles, axes and adzes. But it is, perhaps, the wooden carts that call for closer attention.

The numerous toy models found at Indus sites suggest that there were perhaps three main forms of these vehicles. First, and most common, a two-wheel cart with a broad frame, which was mainly meant for goods' transport; second, a fourwheel cart with a spoon-like wooden frame protecting the occupant-driver; and, third, a light cart or chariot, of which we have bronze models from Harappa and Chanhu-daro. The wheels in all these models are solid (spokeless), sometimes with hubs, but generally flat. The fact that the bronze models from the Mature Harappan period (and the one apparently preserved at the Late Indus colony at Daimabad, also show spokeless wheels is decisive, since spokes could have been more easily shown in bronze than in terracotta. The draught animals have not been found attached to the shafts of any of the toy carts (except at Daimabad); but toy figurines of oxen in clay and bronze found separately have been seen to fit the toy carts fairly well. It can be imagined that with copper tools, notably saws, cartmaking should have improved substantially; and it is possible that it was ropes and wooden pins that served basically to keep the cart-frame together. The distance between the parallel cart-ruts at Harappa (Early Harappan levels) was found to be about 1.07 meters, which suggests a very modest size for the cart. The colored model of a wheel with a hub from Chanhu-daro shows that wheels could have been made of three separate blocks of wood.

Rather surprisingly, we have no models of boats except one crude one from Harappa. One drawing scratched on a potsherd shows a vessel with a mast carrying furled sails, with a steersman rowing with an oar. This is our only evidence that Indus carpenters were making vessels that had sails. A seal carries the picture of a river-boat with timbers lashed by ropes, a large two-storied central cabin and high prows, on one of which the steersman sits while rowing. This was, perhaps, the common river-boat of the times, which survived, like the bullock-cart, until modern times.

Some rare surviving fragments show that wood was used in the construction of Indus houses – for doors and their jambs, for beams to support the flat roofs, and for pillars. Sometimes entire structures might have been built of timber. Fragments of house models show that Indus houses had high windows (*rowshandans* of today) with a lattice grill and these were probably also of wood. Shell inlay pieces are believed to have been used to decorate wooden furniture, such as the low stools, the modern-day *peerhi*, that are sometimes depicted on the Indus seals. Beds made of a wooden frame strung with a rope lattice in use today throughout Pakistan may have had their counterpart in the Indus times – at least one seal shows someone seated on such a rectangular contraption.

Wood like *sheesham* was native to the Indus Valley but there is some indication of the presence of exotic wood at Harappa, for example the deodar, also. These trees do not grow in the Indus Valley and it is assumed that they did not grow then either. Most likely such a wood came from the uphills where the Indus people had established their colonies at Ropar and the surrounding region along the river Bias, Sutluj, and Ravi. The timber could have been transported downstream to Harappa through floatation. Although deliberate cutting of trees for acquiring the desirable timber is a distinct

possibility, the capture of uprooted trees floating down the Ravi seems to be more probable.

The textural references from Mesopotamia indicate that they received timber from Meluhha. The description of the wood is, however, intriguiging: it is the dark wood which they imported. Since there is no possibility of mahogany or such other darkwood trees in the Indus Valley and its peripheries, one is lost as to what this timber could have been. The nearest guess is that the inner stems of *sheesham* trees turn dark brown when they get really old. It is thus possible that the Indus people extracted this wood from old growth *sheesham* trees and exported it to Mesopotamia. If it is so, then it is probable that they also used such a timber for their own carpentry. This wood is of small grain and is resistance to termite. In fact, it may be this resistance to termite that the dark *sheesham* wood became dear to the Mesopotamians.

TEXTILES AND OTHER WOVEN ARTS

The prehistory of textile industry is necessarily elusive, as so much of the evidence disappears unless climatic conditions favor its survival. Nevertheless, we know about the presence of cotton at Mehrgarh some two thousand years before the rise of Harappan cities ilke Mohenjo-daro and Harappa and we can infer that textiles, whether of cotton or wool, or whether woven or non-woven, were already common even before the urbanization of the Greater Indus Valley. That the textile crafts, for which Indus Valley remained famous for millennia to come, were quite at home in the Harappan cities as is inferred from occasional impressions of textiles upon earthenware, pottery and faience. A whole class of small faience vessels were evidently formed upon a cloth bag filled with sand or some other suitable substance, leaving the textile impression upon the interior of the pot. The employment of fabric for this and for other equally humble tasks, as in baling goods (evidenced by the cloth impressions upon sealings) surely testifies to its common availability. Whether cotton was as common as wool and animal hair, as it was in historical times in the this region, is not clear.

Next to pottery, we may expect textiles to be the craft engaging large numbers of people. Numerous spindle-whorls of terracotta and frit (unglazed vitreous paste) are found in Indus settlements, showing that hand-spinning was widespread, presumably as a woman's chore in each household, rich and poor as well as that of shepherds on the model of Pothwar and Kohistan of later

days. Hand-spinning with the help of spindle- whorls is still common in many parts of Pakistan, especially among the animal herders of the hilly areas in Baluchistan and the Pashtun country as well as in the deserts of Cholistan and Thal. These herders engage in spinning raw wool while leisurely guiding their grazing herds of sheep and goats through their pastures. It is assumed that a similar practice must have been responsible for producing of wool and cotton thread in the Harappan times.

Cotton Thread and Fabrics: Cotton was known to the Indus people as far back as the sixth millennium BC as the discovery of cotton seed at Mehrgarh indicates. These cotton seeds are of wild cotton and it is not known when in fact the Indus people started to cultivate this crop. It is certain, however, that they arrived at the domestication of cotton as a response to a need which animal hair and hide did not fulfill. Being a luxury item, cotton must have soon become a market crop. Some archaeologists, such as Khurshid (13), suggest that cotton and cotton cloth were the chief export items from the Indus and its economy largely depended on cotton akin to the 'gold rush' of the Americas and the 'oil rush' of today. Although no archaeological evidence is yet at hand that would undisputedly prove this point, cotton is at least a good candidate for an additional crop and textiles is

a logical candidate for a major industry at par with metallurgy and lapidary.

Traces of cotton fabric were identified at Mohenjo-darp, where they were preserved by contact with a corroding silver jar. Many other examples of cotton thread and fabric were identified on copper tools. At Harappa, possible cotton threads were found wrapped around the handle of a small copper mirror from a female burial and also around the handle of a curved copper razor. There are many other traces of Indus textiles or their imprints – the impression of fabric on the inside of faience vessels that had been molded on a sand-filled bag, the imprint of rougher cloth on the reverse of sealings that had been fastened on sacks, and marks on the base of pottery vessels that had stood on cloth to dry before firing. These show that the Indus people were making cloth of various grades, including very fine fabrics closely woven from fine thread.

Some archaeologists have concluded that the uniform thickness of threads in a single piece of fabric and the tight weave reflected by their impressions indicated the use of spinning wheels for the conversion of loose fiber into a coherent thread. These opinions rest on the fact that the hand-spun thread usually is quite irregular; spinning wheels allow more uniform tension and twisting, which results in standardized threads. There is, however, no archaelogical basis for such a speculation. Although the wheel was known and used in carts and potter's wheel, its use in the construction of a spinning wheel is a far cry: no example or clay model of such a spinning wheel has been recovered. On the other hand, the spinning whorls have been used in the Indus Valley and the adjoining areas up to very recent times and some of the fabrics woven from this thread have been quite uniform and tight.

Kenoyer and associates found at Harappa grooved bricks and stones which they took as loom weights, presumably for upright frame looms. The presence of these loom weights, in turn, show that



Miscellaneous Crafts**!**

been. The nearest guess is that the inner stems of *sheesham* trees turn dark brown when they get really old. It is thus possible that the Indus people extracted this wood from old growth *sheesham* trees and exported it to Mesopotamia. If it is so, then it is probable that they also used such a timber for their own carpentry. This wood is of small grain and is resistance to termite. In fact, it may be this resistance to termite that the dark *sheesham* wood became dear to the Mesopotamians.

Textiles and Other Woven Arts

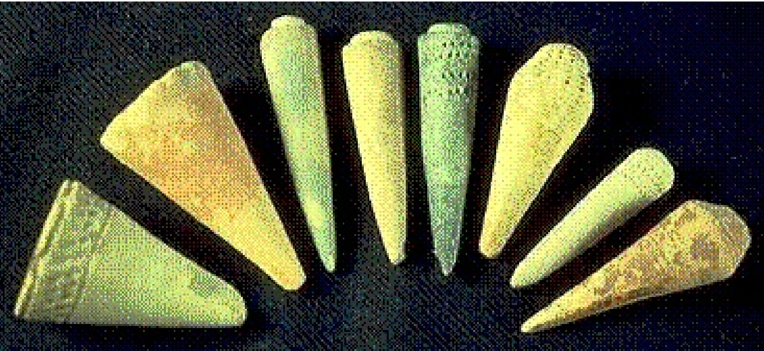
The prehistory of textile industry is necessarily elusive, as so much of the evidence disappears unless climatic conditions favor its survival. Nevertheless, we know about the presence of cotton at Mehrgarh some two thousand years before the rise of Harappan cities like Mohenjodaro and Harappa and we can infer that textiles, whether of cotton or wool, or whether woven or non-woven, were already common even before the urbanization of the Greater Indus Valley. That the textile crafts, for which Indus valley remained famous for millennia to come, were quite at home in the Harappan cities as is inferred from occasional impressions of textiles upon earthenware, pottery and faience. A whole class of small faience vessels were evidently formed upon a cloth bag filled with sand or some other suitable substance, leaving the textile impression upon the interior of the pot. The employment of fabric for this and for other equally humble tasks, as in baling goods (evidenced by the cloth impressions upon sealings) surely testifies to its common availability. Whether cotton was as common as wool and

“Priest King” from Mohenjo-daro with trefoil Ajrak

animal hair, as it was in historical times in the this region, is not clear.

shawl, 3000 BC

Next to pottery, we may expect textiles to be the craft engaging large numbers of people. Numerous spindle-whorls of terracotta and frit (unglazed vitreous paste) are



Terracotta spinning cones from Harappa. These cones are found in almost all Harappan sites in **Terracotta spinning cones from Harappa. These cones are** counterparts are still used by the shepherds of Kohistan for spinning of wool as they graze their **found in almost all Harappan sites in Punjab and Sind and**

at several Early Indus sites throughout Sind and Derajaats. Wooden counterparts are still used by the shepherds of

Kohistan for spinning of wool as they graze their goats and sheep

Miscellaneous Crafts! identified on copper tools. At Harappa possible cotton threads were found wrappedHarappan Civilization - The Material Culture
around the handle of a small copper mirror from a female burial and also around the
some households used large upright looms to handle of a curved copper razor. There are many other traces of Indus textiles or their today, but some domestic and high quality commer weave cloth. Backstrap looms, which have been cial weaving may have taken place in the city itself. imprints – the impression of fabric on the inside of faience vessels that had been molded
common in the villages and nomadic camps A relatively on a sand-filled bag, the imprint of rougher cloth on the reverse of sealings that had **The Discovery of Silk Thread:**
throughout Pakistan and Afghanistan up to very recent and important discovery in the Harappan been fastened on sacks, and marks on the base of pottery vessels that had stood on cloth

recent times, may also have been used to produce realm is the presence of silk. Silk is an important to dry before firing. These show that the Indus people were making cloth of various
narrow strips of fabrics that would have been sewn economic fiber, and is generally considered to have grades, including very fine fabrics closely woven from fine thread. been the exclusive cultural

heritage of China. Not only has early evidence for silk been assumed to be limited

Miscellaneous Crafts ! to China, but the techniques of degumming and placed in parallel some distance apart from each other. A continuous thread is then reeling have also been wrapped around these sticks in close proximity. This forms the 'warp'. The weaver

considered exclusive Chi
nese silk industry 'secrets'.

takes a length of another thread and goes through the individual thread element of the The process of degumming warp – once over it and once under it. This constituted the 'filling'. A wooden oris one in which the sericin seashell

comb is used to compact the filling and the process repeated in the reverse gum is removed from the direction. The 'loom' itself is laid out horizontally on the ground. Since there is no silk, by submerging the



cocoons into a weak alka Terracotta impression of a coarse fabric from Mohenjodaro. The simple basket-weave coneffective mechanism to keep the width of the fabric uniform, only small lengths of

struction is easily visible. line solution. Reeling silk is fabrics of uniform width can be woven. Such looms are best suited to weave heavy,a process by which the narrow, fabrics. Much of this work may have **Terracotta impression of a coarse fabric from Mohenjo-daro. The simple basket-weave** been carried out in the villages struction is easily visible. long silk strands are col

construction is easily visible.

surrounding the city, as is common throughout rural Pakistan today, but some domestic lected on to a bobbin rather

and high quality commercialthan needing to be twisted Some archaeologists have concluded that the uniform thickness of threads in a single weaving may have taken place in the as staple fiber into a spun piece of fabric and the tight weave reflected by their impressions indicated the use of thread. These two important silkworking processes spinning wheels for the conversion of loose fiber into a coherent thread. These opinion city itself. have been thought to be part of a 'package' of Chirests on the fact that the hand-spun thread usually is quite irregular; spinning wheels nese technology known only to China until well into

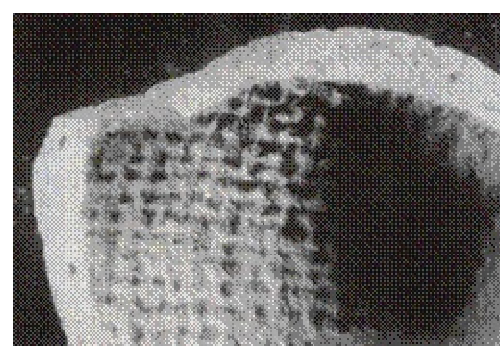
We do not know the color of Indus
allow more uniform tension and twisting, which results in standardized threads. There

is, however, no logical basis for such a speculation. Although the wheel was known and fabrics. It is assumed, however, that Not only has early evidence for silk been as used in carts and potter's wheel, its use in the construction of a spinning wheel is a far some natural dyes were used to color sumed to be limited to China, but the techniques of

cry: no example or clay model of such a spinning wheel has been recovered. On the
degumming and reeling have also been considered
the cotton fabrics to pale yellows,
other hand, the spinning whorls have been used in the Indus Valley and the adjoining
exclusive Chinese silk industry 'secrets'. The proc
beiges, and browns. The minute
areas up to very recent times and some of the fabrics woven from this thread have been
ess of degumming is one in which the sericin gum is fragments of dyed woven cotton
quite uniform and tight.

removed from the silk, by submerging the cocoons
recovered
from
Mohenjodaro

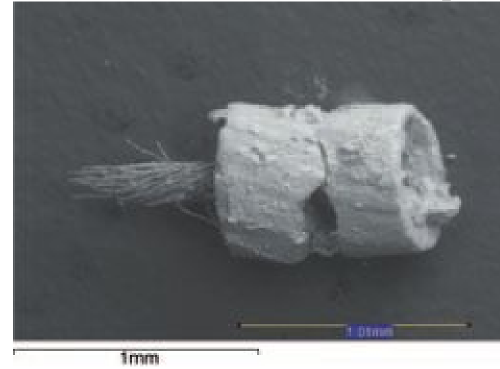
into a weak alkaline solution. Reeling silk is a procKenoyer and associates found at Harappa various sized grooved bricks and stones whichconstitute one of the two earliestare collected on they took as loom weights, presumably for upright frame looms. The presence of these to a bobbin rather than needing to be twisted as

known examples of cotton cloth in
loom weights, in turn, show that some households used large upright looms to weave staple fiber into a spun thread. These two important
Textile impression on terracotta from Harappa. The the world. It is also possible that the
cloth. Backstrap looms, which have been common in the villages and nomadic camps silkworking processes have been thought to be part **Textile impression on terracotta from Harappa. The fabric** Indus people had learnt the art of
throughout Pakistan and Afghanistan up to very recent times, may also have been used
of a 'package' of Chinese technology known only to
dying woolen cloth with the mordant
seems to be rather coarse
to produce narrow strips of fabrics that would have been sewn together to form wide China until well into the early centuries.The earliest
dyes which have their base in minerals of copper, cobalt, iron, etc. Some archaeologists evidence to date for silk in China comes from an
cloaks or blankets. These 'looms' essentially consist of two horizontal wooden sticks
have speculated that the Indus people could have practiced the art of block printing. isolated find possibly as early as ca. 2570 BC from
together to form wide cloaks or blankets. These *New evidence for early silk in the Indus Civilization* 463 'looms' essentially consist of two horizontal woodenAlthough the technology of making printing blocks was definitely there (akin to the
sticks placed in parallel some distance apart from
manufacture of seals), it is unlikely that the art of printing could have evolved. The

each other. A continuous thread is then wrapped
required knowledge of chemistry could not simply be there.
around these sticks in close proximity. This forms
the 'warp'. The weaver takes a length of another

Carpet-making was probably developed by nomadic communities long before the rise of
thread and goes Th.rough the individual threadthe Indus cities, but it may have been practiced in the urban centers as well. All major

element of the warp – once over it and once under
Indus settlements have examples of small, curved copper blades that have been called
it. This constituted the 'filling'. A wooden or seashell
comb is used to compact the filling and the process razors. Some archaeologists take them as
specialized tools for cutting the tied threads
repeated in the reverse direction. The 'loom' itself is
on pile carpets. This interpretation seems to be rather too far-fetched. It is, however not
laid out horizontally on the ground. Since there is no
beyond a realm of possibility that the Indus people could have been making woolen felt
effective mechanism to keep the width of the fabric



and using it for making their winter coats or using it as area rugs to sleep on. The
uniform, only small lengths of fabrics of uniform Figure 6technique of felt making is rather simple: tufts of
width can be woven. Such looms are best suited to
Steatite (enstatite) microbead from Chanhu-daro showing slightly 'S' twisted single-ply thread. Photomicrograph by I. Good and R. Newman.
wet wool is pounded into a flat
A steatite (enstatite) microbead from
weave heavy, narrow, fabrics. Much of this work structure, enlarging it as one keeps on adding more
and more tufts while keep on**Chanhu-daro showing slightly 'S'** may have been carried out in the villages
surround**twisted single-ply silk thread. Photomi**pounding. This simple technique is still used by some Baluch nomadic pastoralists to
ing the city, as is common throughout rural Pakistan **crograph by I. Good and R. Newman.**

make felts of considerable size and then embroidering it with cotton or wool thread to give the structure a degree of stability and color. These primitive area rugs are sometimes quite beautiful and are known in the area as *namda*.

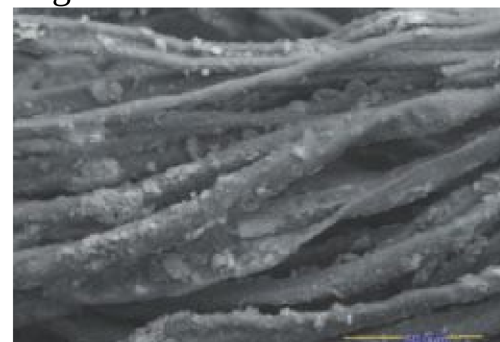


Figure 6 *Steatite (enstatite) microbead from Chanhu-daro showing slightly 'S' twisted single-ply thread. Photomicrograph by I. Good and R. Newman.*

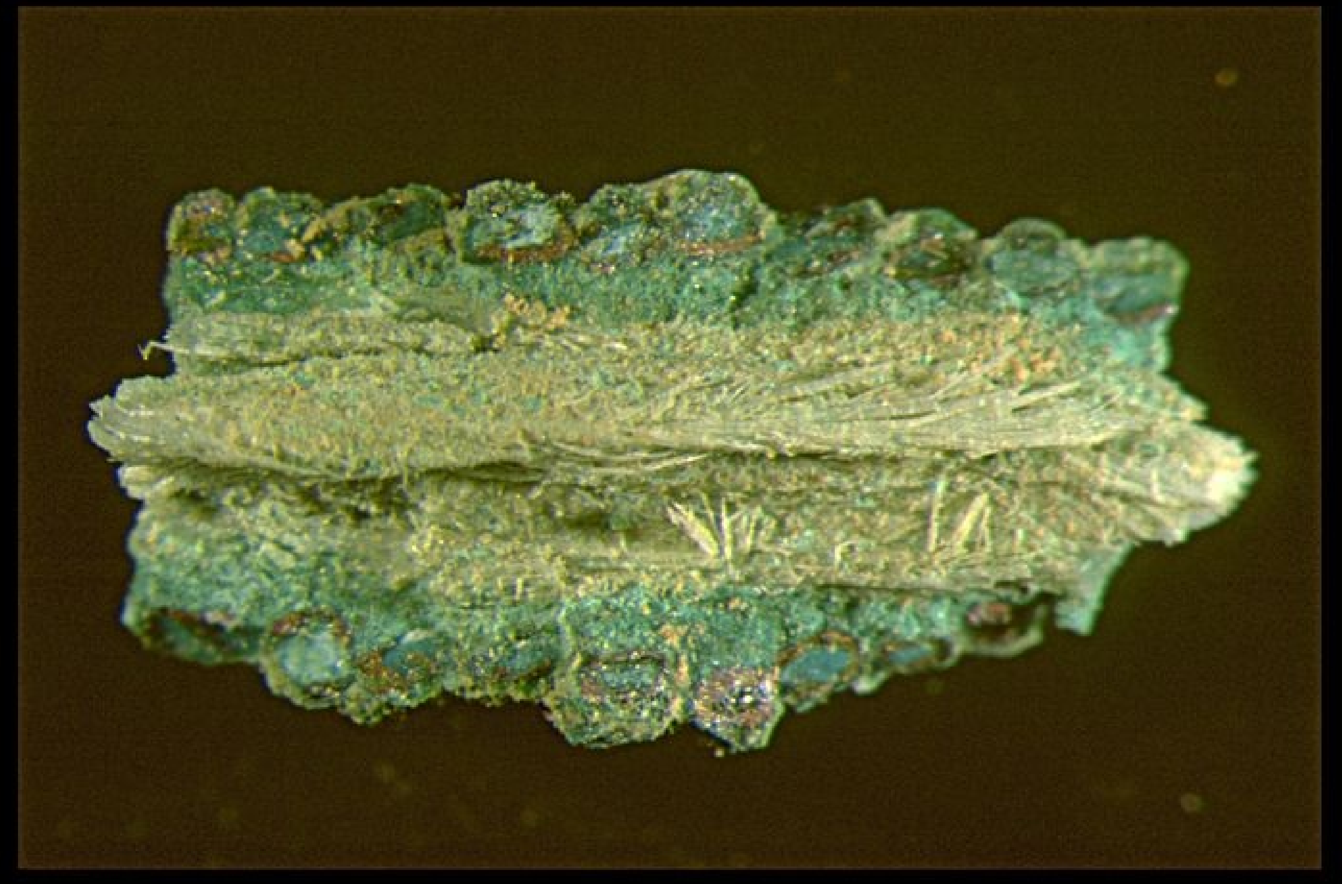
the Liangzhou Neolithic site of Qianshanyang. Silk weaving is evident from the Shang period ca. 1600– 1045 BC, though the earliest evidence for silk textiles in ancient China may date to as much as a millennium earlier. There is evidence for silk from a bead thread at Nevasa in peninsular India ca. 1500 BC (17).

Recent work at Harappa (15,16) has been carried out by the Harappa Archaeological Research Project (HARP), directed by Meadow, Kenoyer, and Wright in collaboration with the Department of Archaeology and Museums of the Government of Pakistan. A study of artifacts recovered from the 1999 and 2000 seasons at the site has revealed the presence of silk at Harappa (14). Mi Figure 7cromorphological study indicates that the silk known

to the ancient inhabitants of the region was the wild silk rather than the commonly known silk today.[462]
There is no evidence to suggest that it was woven a reeled (but not degummed) silk. It is not certain at this stage of research from which species into fabric. rather than the presently domesticated of silkmoth these fibres derived. The fibres may be from *A. assamensis* or possibly from variety, *Bombyx mori.* a species of *Philosamia* (Eri silk).Chanhu-daro was excavated in the winter of

1935–36 by the first American Archaeological Ex
pedition to India directed by Ernest Mackay and DISCUSSION sponsored by the American Oriental Society and the Boston Museum of Fine Arts. A recent survey of The formal exportation of silk from China took place around 119–115 bc during the reign of excavated small finds (principally copper or copper- Han Emperor Wu-ti, who sought the fabulous blood-sweating ‘celestial horses’ of Ferghana alloy artifacts such as razors and bowls) currently in(in modern day Uzbekistan). Yet archaeologists have puzzled over the early presence of silk in

a late prehistoric Celtic site in Germany *c*. 700 bc, as well as silk finds from several other sites in Europe, the Mediterranean, Egypt and Central Asia (see, for example, Richter 1929; Hundt 1971; Askarov 1973; Wild 1984; Braun 1987; Lubec *et al.* 1993). For decades, archaeologists have cited these findings as evidence for early contact between China and the West (for full discussion see Good 1995; see also Good in press). What has not been



adequately considered in the literature, however, is the possibility that a non-Chinese (and

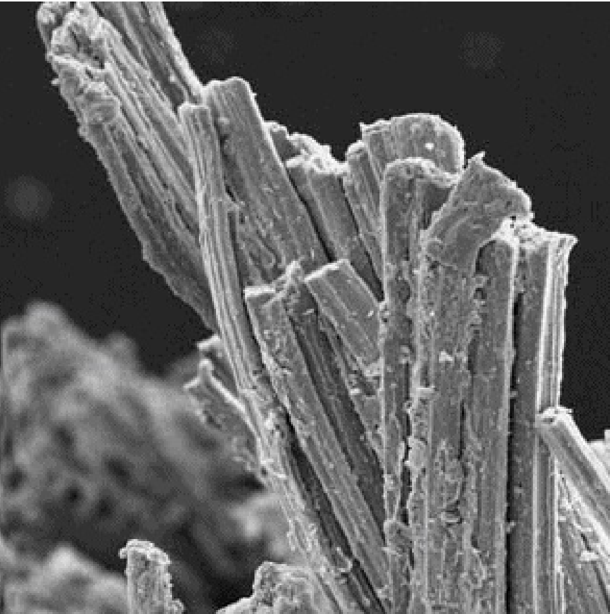
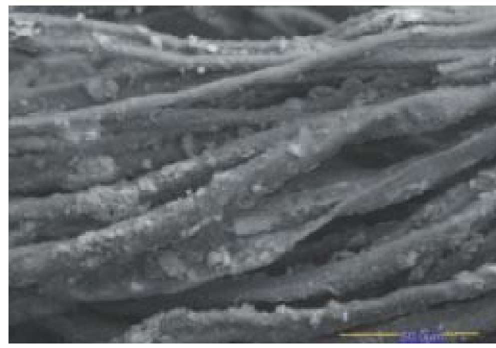
© University of Oxford, 2009, *Archaeometry* **51**, 3 (2009) 457–466

Figure 4 *Harappa 2242-1. Image showing ends and brins with longitudinal striations characteristic of* Antheraea mylitta. *Photomicrograph by J. M. Kenoyer.*

Photomicrograph of Silk fibers from Harappa: Image showing ends and brins with longitudinal striations

characteristic of A*ntheraea mylitta.* (*J. M. Kenoyer***).**  **Silk fibers recovered from microbead at Chanhu**

Fibres from microbead. Photomicrograph by I. Good and R. Newman.

daro, depicted in the above figure. Photomicrograph by I. Good and R. Newman.

I. L. Good, J. M. Kenoyer and R. H. Meadow

Fiber pseudomorphs preserved by copper salts on the interior of the coiled copper necklace that have been analyzed and determined to be silk from the wild silk

moth, *Antheraea mylitta,* commonly called "Tussar" silk today.

the Boston MFA collections revealed several objects with either textile ‘pseudomorph’ or actual extant textile adhering to surfaces of objects. One object, a heat-fused cluster of microbeads made of enstatite (heated magnesium silicate, perhaps in the form of steatite) found inside a copper or copper-alloy bowl, had been published in Mackay’s report. The microbeads contained therein were noted to include intact thread remains. The object dates somewhere Harappan phase. This knowledge helps to explain between 2450 and 2000 BC.(14).

Figure 5 *Modern specimen of* Antheraea mylitta *detail showing distinctive longitudinal striations in fibroin brins.*

Photomicrograph by I. Good and M. Derrick. other early instances of silk in Eurasia outside of This new evidence of silk from both the reChina, specifically from the mid-second millennium cent excavations at the site of Harappa and from BC. By careful analysis of archaeological silk fiber the Chanhu-daro collection curated at the Museum

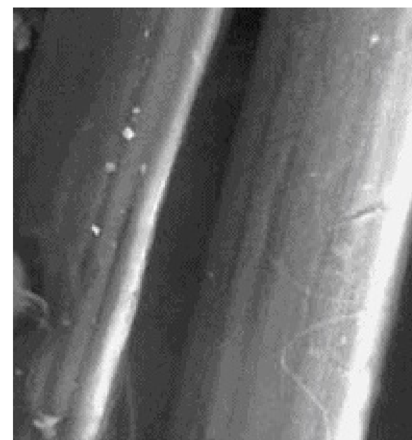
surface morphology, one can distinguish between

Microbead and thread samples from this object from Chanhu-daro were removed and 431analysed. The thread consists of a single ply of approximately 40–50 strands, with a slight ‘S’ twist (approximately 12–15°). Fibres from the thread were studied under SEM at 20 kV without sputtercoating. They appear partially gummed and partially twinned, characteristic of

of Fine Arts, Boston (14), indicates that silk threads were being produced nearly a millennium earlier than the Nevasa finds, and were being used in more than one Indus settlement during the height of Indus urbanism. This new discovery of silk in the Indus Valley pushes back the earliest date of silk outside of China by a millennium and is roughly contemporaneous with the earliest evidence for silk from within China.

The variety in type, technology and thread forms of these few rare examples of silk offers us a glimpse into the extent of knowledge about sericul

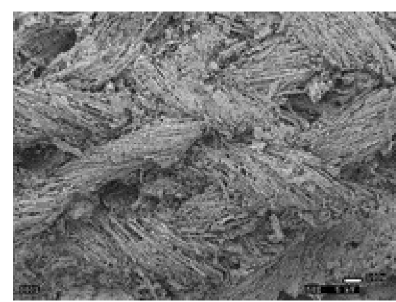
ture in the Indus Civilization during



the Mature
Harappan Civilization - The Material Culture

the source silk-worm species. Through this type of study we can also begin to better understand the origins of silk use further to the East. The discover

Pseudomorph of jute cloth from Harappa (*R.P.Wright***)**

be preserved in impressions, recorded in casts and studied with SEM (see the SEM figure below).

Coloring of Textile Fabrics: We do not know the color of Indus fabrics but the existence of dying vats at Mohrenjo-daro definitely indicates the practice of fabric dyeing in the Harappan Civilization. It is assumed that some natural dyes were used to color the cotton fabrics to pale yellows, beiges, and browns. The minute fragments of dyed woven cotton recovered from Mohenjo-daro constitute one of the two earliest known examples of cotton cloth in the world. It is also possible that the Indus people had learnt the art of dying woolen cloth with the mordant dyes which have their base in minerals of copper, cobalt, iron, etc. Some archaeologists have speculated that the Indus people could have practiced the art of block printing. Although the technology of making printing blocks was definitely there (akin to the manufacture of seals), it is unlikely that the art of printing could have evolved. The required knowledge of chemistry could not simply be there..

Carpet Making: Carpet-making was probably developed by nomadic communities long before the rise of the Indus cities, and it may have been practiced in the urban centers as well. All major Indus settlements have examples of small, curved copper blades that have been called razors. Some archaeologists take them as specialized tools for cutting the tied threads on pile carpets, as it is done today. This interpretation seems, however, somewhat too far-fetched. On the other hand, It is not beyond a realm of possibility that the Indus people could have been making woolen felt and using it for making

their winter coats or using it as area rugs to sleep

SEM-produced impression of a jute fabric on a terra-cotta sherd from Harappa

ies described here demonstrate that silk was being used over a wide region of South Asia for more than 2000 years before the introduction of domesticated silk from China. Earlier models that attribute the origins of silk and sericulture exclusively to China need to be re-examined and revised.

Flax and Jute: So far there was no definite proof of flax and jute textiles in the Indus Valley but HARP investigations at Harappa have turned up a terracotta object on which the imprint indicates the use of jute or flax fabric (see the figure below, provided by Rita Wright). Rita Wright and colleagues have recently reported additional evidence based on analysis of fibre impressions preserved in the above mentioned ceramic sherd. This demonstrates that quite fine detail can We do not know much about the embroidery and printing on fabrics and dresses by the on. The technique of felt making is rather simple: Harappans. In two cases of stone sculptures the garments were carved with special designs, which indicates the garments were embroidered or printed. On one fragmentary



This room in VS area at Mohenjodaro was made with bricks set on edge to crerate a water-tight floor. A small well was located at the southeast corner. Circulasr brick depressions were set into the floor, pre

sumably to hold lasrge pottery in place. The excavators suggested that the place might be a dyer's work **This room in VS area at Mohenjodaro was made with bricks set on edge to crerate a water-tight floor. A small well was located at the southeast corner. Circulasr brick depressions were set into the floor, pre- sumably to hold las**

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sculpture, the garment is covered with tiny drill holes that may have been filled with
dyer's workshop.

pigment to create a spotted cloak. In the cloak of the "priest king," described in the previous pages, carefully drilled and hollowed out designs of circles, double circles and trefoils were originally filled with a red pigment. The rest of the garment may have been

[432] colored with other pigments, but no traces remain. Many scholars have suggested that these designs represent block printing, but this is probably not the case because the design is not repeated identically over the entire garment. The cloak may have been made with embroidery, applique or decorated animal skin. In modern Pakistan, on

festive occasions and particularly when the cattle is marked for sacrifice, the white hide

well represented through impressions on hardpacked clay floors and fired clay lumps at Harappa as well as Mohenjo-daro. Coiled baskets and woven mats were made from reeds and grasses, possibly using polished bone awls and spatulas. In addition to woven materials, various types of twisted cord were made from hemp or other vegetable fibers, for tying bundles of goods and supporting greenware pottery as it dried. In fact, the art of weaving of baskets and mats preceded even the art of making pottery in Baluchistan. Archaeologists have found the evidence of making pottery as early as 6th millennium BC at Mehrgarh and some other sites whereby woven baskets were used as molds for

forming pots. Such pottery has been named as Basket-marked pottery by Possehl (see Volume II: A *Prelude to Civilization*).

IVORY

Miscellaneous Crafts!

represented through impressions on hardpacked clay floors and fired clay lumps at Harappa as well as Mohenjodaro. Coiled baskets and woven mats were made from reeds and grasses, possibly using polished bone awls and spatulas. In addition to woven materials, various types of twisted cord were made from hemp vegetable fibers, for tying bundles of goods and supporting greenware pottery dried. In fact, the art of weaving of baskets and mats preceded even the art of making tufts of wet wool is pounded into a flat structure, enlarging it as one keeps on adding more and more tufts while keep on pounding. This simple technique is still used by some Baluch nomadic pastoralists to make felts of considerable size and then embroidering it with cotton or wool thread to give the structure a degree of stability and color. These primitive area rugs are sometimes quite beautiful and are known in the area as *namda*.

Embroidery: We do not know much about the embroidery on fabrics and dresses by the Harappans. In two cases of stone sculptures the garments were carved with special designs, which indicates the garments were embroidered or printed. On one fragmentary sculpture, the garment is covered with tiny drill holes that may have been filled with pigment to create a spotted cloak. In the cloak of the "priest king," described in the previous pages, carefully drilled and hollowed out designs of circles, double circles and trefoils were originally filled with a red pigment. The rest of the garment may have been colored with
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festive cocasions and particularly when
the cattle is marked for sacrifice, the white
hide is often decorated with red spots made with *hena*. This practice has its roots in earlier traditions and that may reach back to as far as the Harappan
Phase. The cloak of the "priest-king" was

obviously a ceremonial garment and may



pottery in Baluchistan. Archaeologists have have been decorated in a similar manner.
found the evidence of making pottery as early as 6th millennium BC at Mehrgarh and some other sites whereby woven baskets BASKETMAKING were used as molds for forming pots. Such pottery has been named as Basket-marked
pottery by Possehl (see
Three finely decorated rods from ivory, found at Mohenjo-daro. Threes *Prelude to Civilization*)
Basketmakingandmat-weaving, **may have been used as gaming counters (***Kenoyer***)** which may have been domestic crafts, are Miscellaneous CraftsIvory



An spiral impression of the bottom of a woven basket at Harappa (after Kenoyer)



An spiral impression of the bottom of a

An spiral impression of the bottom of a woven basket at woven basket at Harappa (after Kenoyer)

Harappa (*after Kenoyer***)**

represented through impressions on hardpacked clay floors and fired clay lumps at Harappa as well as Mohenjodaro. Coiled



baskets and woven mats were made from

Ivory 'fortune telling' rod

reeds and grasses, possibly using polished bone awls and spatulas. In addition to

Ivory seems to have been scarce in the Indus Civilization,

woven materials, various types of twisted Ivory seems to have been scarce in the Indus

despite the elephant being a familiar animal on seal and Civilization, despite the elephant being a familiar

cord were made from hemp or other

animal on seal and despite the origin of ivory work Mehrgarh. Only a few pieces of ivory work have turned up

vegetable fibers, for tying bundles of goods in the Neolithic times at Mehrgarh. Only a few

in Mohenjodaro. On the other hand, there is strong textural pieces of ivory work have turned up in Mohenjo

and supporting greenware potteryMesopotamia that the Indus people as it

daro. On the other hand, there is strong textural

dried. In fact, the art of weaving of basketssupplied ivory work to the rulers of Ur: the written sources

evidence from Mesopotamia that the Indus people

and mats preceded even the art of making supplied ivory work to the rulers of Ur: the written
sources mention small birds made of ivory, which*chaussar*, seem to have pottery in Baluchistan. Archaeologists have

been popular with the Indus people. Gaming counters and they imported from Meluhha. Board games, the

early as 6

th

found the evidence of making pottery as dice for use in these games were made of a variety of 433 materials, those of ivory being the finest. The counters millennium BC at Mehrgarh and some other sites whereby woven baskets were used as molds for forming pots. Such pottery has been named as Basket-marked were thin rectangular rods engraved with dots and lines, pottery by Possehl (see *Prelude to Civilization*) their tops often carved in the shape of animals or birds.


Measuring rod made of ivory
would then saw the shell into rings using a bronze saw and finish them by grinding them on an abrasive
carved with a chevron motif, from Harappa (after Kenoyer)

chaser type, seem to have been popular with the Indus people. Gaming counters and dice for use in these games were made of a variety of materials, those of ivory being the finest. The counters were thin rectangular rods engraved with dots and lines, their tops often carved in the shape of animals or birds.

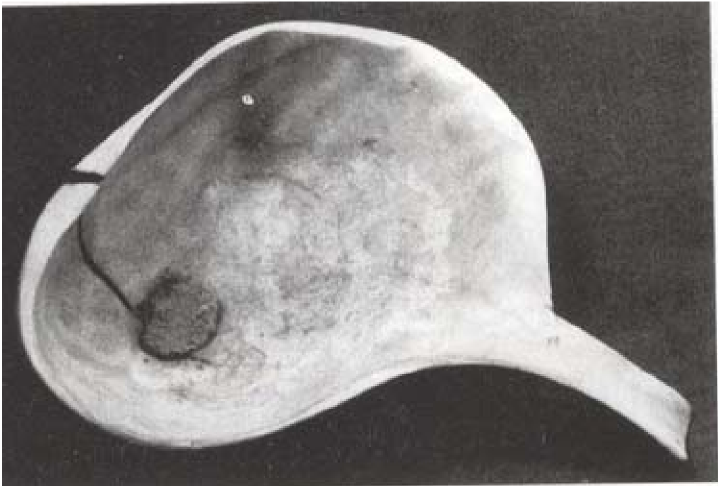
Workshops where ivory objects were carved have been found in a number of Indus towns and cities, including Harappa. Ivory tusks were being used even by the people of early Mehrgarh, thousands of years before the Harappan Civilization. Elephants were most likely hunted in the wild in the Neolithic times in Baluchistan but it is possible that the Indus people had later succeeded in domesticating elephants. A number of Indus seals show an elephant covered by a cloth, suggesting that they were tame, and a figurine from Harappa depicting an elephant with a painted face points to the same direction.

Comparatively few examples of ivory carving have been found. They include combs, probably the cousins of those imported to Ur, carved cylinders, perhaps for use as seals, small sticks and pins. A unique piece of a much-damaged plaque carved with a human figure in low relief is notable.

SHELLWORKING

Objectsproduced
from marine shell are
widely distributed. They Miscellaneous Crafts! provide an important

resource for archaeolo



gists interested in dis likely hunted in the wild in the Neolithic times in Baluchistan but it is possible that the Indus people had later succeeded in domesticating elephants. A number of Indus seals

certain species of shell

show an elephant covered by a cloth, suggesting that they were tame, and a figurine

Indus area. A
are confined to re

stricted areas. Of thefrom Harappa depicting an elephant with a painted face points to the same way.

principal shells utilized, **A large ladle found with burial pottery in a disturbed**A large ladle found with burial pottery in a

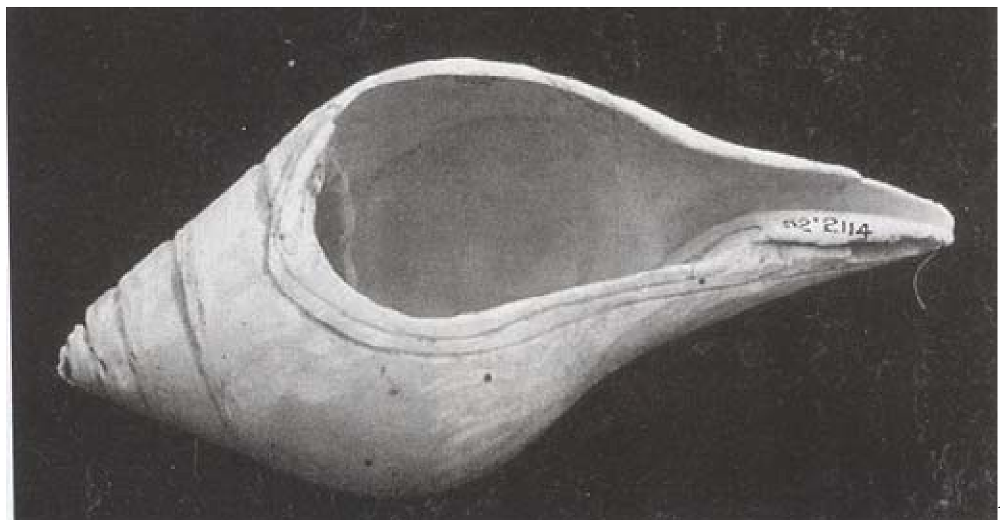
conch *(Tubinella)* is Comparatively few examples of ivory carving have been found. They include combs,
Two wide bangles each made probably the cousins of those imported to Ur, carved cylinders, perhaps for use as seals, disturbed burial of the Harappan cemetery

coast, Kutch and (after Kenoyer)

small sticks and pins. A unique piece of a much-damaged plaque carved with a human

surface. The debris in workshops at Mohenjodaro shows that each stage in the process might be undertaken by different workers working in separate locations.
Makran coast, and *Chicoreus* and *Fasciolaria,* are Elaborately crafted objects such as shell ladle and libation vessels may have been usedderived from along the Omani coast and in Kutch. for pouring sacred offerings of water, milk. oil or butter. These shell ladles were made There also is significant variation in shell produc
from the spiney murex shell. *Chjcoreus ramosus*. Coastal shell workers cut and ground tion, organization, and distribution.the shell to prepare a roughly shaped ladle. These unfinished pieces were then traded to
Seashell working was established at Balakot
larger sites such as Harappa and Mohenjodaro, for the final grinding and polishing.
in Baluchistan and Dholavira in Gujrat. It is believed

Fragments of finished shell ladles have been found at most Indus settlements but only that the marine shells must have come from places
rarely is a complete ladle recovered, usually buried in a room or as a funerary offering.
on the seashore in the vicinity of these townships.
At Harappa, a large ladle that had been repaired with a lead rivet in one of the burials

along with some pottery was  found.

Several examples distinctive vessels have been found at Mohenjo-daro

central columella and interior whorls. After the interior was hollowed out. the exterior

FascjoJarja trapezjum, found at the nearby

was ground smooth and incised with spiraling lines or circles that were filled with red pigment. Far to the west, the priests of Mesopotamian temples used similar shell vessels of this vessel from the conch

Libation vessel decorated with vermillion-filled incised lines, shell was not an easy

which were made for pouring oil in libation to the deities or for dispensing sacred

Libation vessel decorated with vermillion-filled incised requiring hardened

unguents. In later Hindu and Buddhist rituals, identical libation vessels made from *Thrbjnella pyrum* kings and for dispensing sacred water or milk. Even today, this type of libation vessel is used throughout India for ritual libations and for dispensing medicinal preparations. Recently some Indian archaeologists have started to hype the role of Nageshwar in the Indus shell industry. Nageshwar was situated on a freshwater lake with easy extensive shallow bays in the sheltered waters of the Gulf of Kutch from which abundant supplies of *Turbinella pyrum* *Chicoreus ramosus* carved with a chevron motif, Khambat, clam shells figure in low relief is notable.

shell and carved with a chevron motif, from

Shellworking

(Tivela or *Meretrix)* come exclusively on the

The Gulf of Kutch produced several species of shellbe obtained. According to these scholars, thethat were used to make bangles, ladles and inlay. It unfinished oris interesting to note that seashells were processedsemi-finished shell was exported to thMohenjodaro, Chanhu-daro,

not only in the coastal areas but also as far as

Balakot, and other Harappan sites to work them into useful objects. This undue

hype is

Harappa and Mehrgarh. Complete shells as well as

Seashell working was established at Balakot unwarranted for several reasons. First, there is no evidence that Nageshwar was a

coastal resource areas directly to the large cities

in Baluchistan and Dholavira in Gujrat. It is Harappan site, it was in fact a post-Harappan settlement, thus having no or little relation

and industry centers such as Naushahro. Some

believed that the marine shells must have with the Indus Civilization. Second, these shells were not specific to Gujarat coast and

coastal settlements also produced their own fin

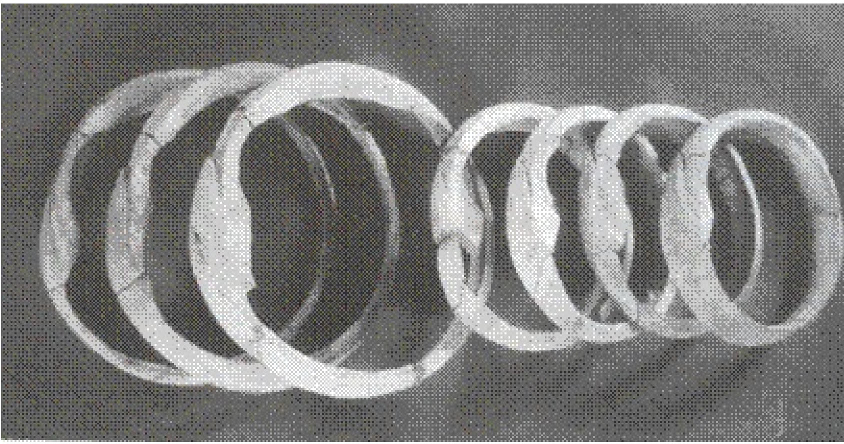
come from places on the seashore in thecould be gathered in the shallow waters all along the Indus coast. Third, the conch

competition with the products from the larger urban

centers.shell is much less frequently encountered in the Indus Valley during the Harappan
Kutch produced several species of shell that Civilization, its use became more common in the post-Harappan era.
were used to make bangles, ladles and inlay. were cut with a specialized Jewelrybronze saw that would have been available only in
It is interesting to note that seashells were

the largest workshops. By studying the depth of

processed not only in the coastal areas but
each saw stroke on fragments of shell from the anOrnaments are worn for symbolic, ascetic, ammuleticalso as farworkshops,as Harappa and Mehrgarh. basic
shape of the saw. It had a very thin serrated edgepurposes. Symbolically, they

along with some pottery was found.
Several examples of these
distinctive vessels have been
found at Mohenjo-daro andShell bangles recovered from the burial of an

one example made from**Shell bangles recovered from the burial of an elderly** another shell species,elderly
woman at Harappa (after Kenoyer) *FascjoJarja trapezjum*, was

found at the nearby site of Complete shells as well as partly processed Chanhudaro. The manufacture shell objects were traded from the coastal resource areas directly to the large cities and434 outward markers of age, sex, social status, ethnicity,

of this vessel from the conch
shell was not an easy
task,

finished goods and traded them to local consumers in competition with the products industry centers such as Naushahro. Some coastal settlements also produced their own and religious affiliation. Kenoyer believes that there

requiring hardened bronze

chisels to break the strong from the larger urban centers.



were regional differences in the way ornaments were used and discarded. Different types of ornaments

. Coastal shell workers cut and ground

th e northern
-dunes, show stribution map fifth millennia IV; Jusupov, we adopt the her a depopu- and the Late tion of this Age. Unfortueolithic cannot more complete t strip of the

a n phase): as the Murghab of the Tedzhen: and are easy to there was irriand at Khapuz

area. Dur- ttle plain of irrigation delta canals. should have between the Shortughai duris concerne d the with what Indus civilis- know of the isation. Even the developed Il). A large been found carnelian beads beads; agate ll bangles; a

that was long and curved, similar to the saws still used in shell bangle making in modern Bengal. Even more astounding is the fact that the Indus bronze saw was able to cut the shell as efficiently as the modern steel saws, which suggests that the Indus bronze workers were able to bronze that was as hard as steel (21).

Shell bangle production areas were segregated depending upon the types of shell utilized, indicating different forms of organization of production and distribution. In one workshop, clam shell bangles were produced by chipping and grinding; a single bangle was produced from each shell. The workshop was located on a mudbrick platform onto which a temporary shelter had been erected.

Early periods of Shortughai **and** Dashly 171 Associated with the shelter were large quantities of

shell-working debris and unworked shells. The temsquare seal depicting a rhinoceros; zebu figurines; eleporary nature of the workshop and the large quanti
ties of bangles, likely beyond what would be consumed at this relatively small site, suggest the ban 22.2-22.8).
gles were not for local consumption but for export to other areas. One of several possible scenarios are suggested by Vidale, who leads to the interpretation produce a

at Balakot
Fig. 22.2. Shell bangles.**Shell bangles from Shortugai**

that shell manufacture was under the organization and control by elite merchants living there (11). In a second workshop, bangles were cut from conch shells with bronze saws that have strong cutting edges. (18).

F ig. 22.3. Indus seal depicting a rhinoceros. The separation of shell-working technologies in different workshops and the differences in forms of organization are in keeping with evidence from other Harappan settlements. At Nageswar and Kuntasi, specialized areas were devoted to specific parts of the shell production sequences, indicative of different forms of specialization and organization of production and distribution. At Nageswar, shellworking debris is segregated from residential areas. The division of labor is reminiscent of assembly line production in which only one step in the production process is present at each station. In one workshop, for example, waste from conch shells included chipped

and sawn shell, the last step in production, while in another only the apexes of the

Fig. 22.4. Terracotta figurine of a zebu. 435 shells were present representing the first step in production (11). In other workshops segregation of production was based upon the end product and/or the type of shell being exploited. For example, in one conch workshop inlay pieces, beads, and other items were being produced, while in another, ladles were made from spiney murex shell. The variety of end products and the presence of extensive workshops has been interpreted as production intended for long-distance trade to inland settlements.


An example of spiny Murex shell, from which ladles were made


Shank, a conch shell, was used by the Harappans for obtaining bangles of different sizes

From these several examples, a clear picture emerges of production and distribution of shell species from nearby sources and the exchange of shell over long distances. It demonstrates that shell, in its raw and finished form, was a highly valued commodity and integral to internal and long-distance trade. The large-scale and specialized production at the workshops at Balakot, Nageswar, and Kuntasi are examples of a highly organized activity intended for non-local consumption while at the same time objects (especially bangles) were produced for local use.
Harappan Civilization - The Material Culture

Shell industry of the Harappan period reflects the stratification in the trade of raw material and the movement of finished objects. At Mohenjo daro, Chanhu-daro, Harappa, Nagwada and Lothal we see a wide variety of objects being primarily produced for the markets within the sites and the nearby sites. On the other hand small rural or coastal sites like Allahdino, Balakot and Nageshwar produced a limited range of artefacts. At Balakot the intensive production of *Tivela damaaides* bangles appears to have oriented towards a regional market along the western coast. At Allahdino, bangles appear to have been specifically for local inhabitants (19) Nageshwar, however, seems to have been a specialized centre in the production of bangles and ladles primarily for regional and markets (20). In contrast to specialization between sites, the manufacturing technology was quite standardized. A specific technique for chipping and cutting shell was evident in all distinct workshops and even the width of copper/bronze saw blade was identical. A detailed study carried out by Kenoyer (19) has indicated that the saw used for cutting shell had a long convex cutting edge, that was extremely thin, between 0.4 and 0.6 mm, and might have been bidirectionally denticulated. Several convex saws have

been reported from excavations, but none of them fit the requirements indicated by the study of shell wasters. Although there was some regional variation in the widths of bangles, they were all incised with the 'V' chevron motifs and the tradition continued throughout the Integration Era.

Shell bangles have been reported in nearly all localities of the Harappan Civilization. Bangles were manufactured from many different materials including: faience, terra cotta, bone, copper, and shell but only bangles manufactured from shell are found in mortuary contexts. They were placed almost exclusively on the left arms of middle aged women (33 to 55 years of age)). Today in parts of India, objects of magical significance are not passed on to others. Bangles and jewelry in general represent the reproductive status of women and a change in bangles coincides with a change in status.

The various shells available to the Indus people each had their own particular use. The spiny murex was occasionally made into bangles but its main use was as the only type of shell used for making ladles, objects that seem likely to have been employed in a ritual context, probably for pouring libations. The spines were sawn off and the shell sawn vertically to make two ladles, one smaller than the other. These were then trimmed and ground. The spiny murex is particularly susceptible to marine boring organisms and so frequently these ladles had holes in them that their makers must have stopped up. One ladle found at Harappa had a mend made out of lead. Chank shells were sometimes, with great difficulty, hollowed out and made into a vessel for pouring libations. Similar vessels are still used for this purpose in India and were also used in the ancient Near East although they were made there from a different kind of shell.

The artisans of Balakot and other settlements on the coast of Sindh and the Makran collected shank, spiny murex, spider conch and tulip conch, in the shallow waters of their vicinity. They were used for making objects found throughout the Indus realms, as well as various species whose circulation was more restricted. The conch-shell, found off the Gujrat coast, was a particularly important raw material for shell working. It is found throughout the known Indus area. A number of symmetrical bangles could be made from a single Chank shell, but this required bronze tools and a higher level of skill. The shellworkers would chip off the apex of the shell with a stone or bronze hammer and remove the columella using a metal punch. They would then saw the shell into rings using a bronze saw and finish them by grinding them on an abrasive surface. The debris in workshops at Mohenjodaro shows that each stage in the process might be undertaken by different workers working in separate locations.

Elaborately crafted objects such as shell ladle and libation vessels may have been used for pouring sacred offerings of water, milk. oil or butter. Fragments of finished shell ladles have been found at most Indus settlements but only rarely is a complete ladle recovered, usually buried in a room or as a funerary offering. At Harappa, a large ladle that had been repaired with a lead rivet in one of the burials along with some pottery was found.

Several examples of these distinctive vessels have been found at Mohenjo-daro and one example made from another shell species, *FascjoJarja trapezjum,* was found at the nearby site of Chanhudaro. The manufacture of this vessel from the conch shell was not an easy task, requiring hardened bronze chisels to break the strong central columella and interior whorls. After the interior was hollowed out. the exterior was ground smooth and incised with spiraling lines or circles that were filled with red pigment. Far to the west, the priests of Mesopotamian temples used similar shell vessels which were made for pouring oil in libation to the deities or for dispensing sacred unguents. In later Hindu and

Buddhist rituals, identical libation vessels made from *Thrbjnella pyrum* were used for anointing kings and for dispensing sacred water or milk. Even today, this type of libation vessel is used throughout India for ritual libations and for dispensing medicinal preparations.

Recently some Indian archaeologists have started to hype the role of Nageshwar (in Gujarat) in the Indus shell industry. Nageshwar was situated on a freshwater lake with easy access to extensive shallow bays in the sheltered waters of the Gulf of Kutch from which abundant supplies of *Turbinella pyrum* (chank) and *Chicoreus ramosus* (spiny murex) shells could be obtained. According to these scholars, the unfinished or semi-finished shell was exported to Mohenjodaro, Chanhu-daro, Balakot, and other Harappan sites to work them into useful

lapis lazuli, and steatite were conventional materials used

for the manufacture of beads.

Although ornaments were made from different

rawMarshalI manywas would particularlyindistinguishable

when viewed from a distance and would communi

fortunate in his recovery of

cate similar symbolic messages. Close examination, however, could distinguish the precise nature

gold jewelry, which included

of the ornament, its relative value and presumably objects. This undue selling is unwarranted for several reasons. First, there is no evidence that

A collection of Indus jewelry from Harappa and Mohenjodaro

Nageshwar was a Harappan site, it was in fact a post-Harappan settlement, thus having no or little relation with the Indus Civilization. Second, these

(after Kenoyer)

shells were not specific to Gujarat coast and could be gathered in the shallow waters all along the Indus coast. Third, the conch-shell is much less fre

necklaces with barrel-form beads and disk spacers, quently encountered in the

Indus Valley during the
finger rings, hairbands, ring- and cone-shaped earrings.

Harappan Civilization, its use became more common in the post-Harappan era.

beads arranged in rows between spacers as well as long cylindrical or tubular stone JEWELRY
beads with gold spacers are especially handsome. Indus jewelry is basic: ornaments of many

kinds are in evidence but, bangles, necklaces, and

Although ornaments were made from different raw

earrings are particularly prominent. They are de
picted not only on the figurines but are themselves

found in great numbers on the sites. Most of thebe indistinguishable when

ornaments, stone beaded or metallic, come from

a distance and would communicate symbolic

daro. An important discovery has been from Al

messages. Closelahdino where a hoard of jewelry was found by examination, however, could distinguish the precise nature of the Fairservis during his routine excavation of the site.
ornament, its relative value and presumably

Clay bangles often occur in such abundance

that in any random sample of finds they are among the
economic and socio-ritual status of the wearer. Ranking

the most common. Indus jewelry is also rich in
beads. Shell, bone, ivory, agate, turquoise, carnel

or stratification within the society as a whole would be

ian, some rather poor, lapis lazuli, and steatite were
conventional materials used for the manufacture of

reinforced by the relative value of the raw materials beads. MarshalI was

particularly fortunate in his



themselves. The manufacture of similar styles recovery of gold jewelry, which included necklaces Miscellaneous Crafts! with barrel-form beads and disk spacers, finger of
bangles and beads from different raw materials is not

rings, hairbands, ring- and cone-shaped earrings.

ColIars of round beads arranged in rows betweenor metallic, come from Mohenjo-daro and Harappa, some from Chanhu-daro. An unique to the Indus civilization, but only in the Indus

spacers as well as long cylindrical or tubular stone **culture of the region; it has its roots in the Early In**

beads with gold spacers are especially handsome. important discovery has been from Allahdino where a hoard of jewelry was found by cities do we find such a complex hierarchy of materials Fairservis during his routine excavation of the site. The examples from the peripheries pre-urban era of the Indus Valley the region; it has its roots in the combined with unifying styles and symbols. Early Indus period. These two are rare and mostly of stone

the economic and socio-ritual

bead necklaces are from the pre status of the wearer. Ranking Most of the Indus beads and ornaments have been



or stratification within the soci

-urban era of the Indus Valley. Clay bangles often occur in found as individual items or in clusters in the ruins of forced by the relative value of such abundance that in any Mohenjodaro and Harappa. Some have been recovered from graves at Harappa and Kalibangan. A large number also comes from a few hoards,

the raw materials themselves.

random sample of finds they

styles of bangles and beads

are among most from different raw materials is the common. Indus jewelry is Page 424 Civilization, but only in the also rich in beads. Shell, Harappan cities do we find bone, ivory, agate, turquoise,

materials combined with unify

carnelian, some rather poor

ing styles and symbols.

lapis lazuli, and steatite were

and

ornaments have been

conventional materials used

found as individual items or in

for the manufacture of beads.

Mohenjo-daro and Harappa.

MarshalI
was

A collection of Indus jewelry from Harappa and Mohenjodaro (*Kenoyer*)
A collection of Indus jewelry from Harappa and Mohenjodaro
(after Kenoyer)437
have been

particularly

Some recovered

fortunate in his recovery of
gold jewelry, which included
necklaces with barrel-form beads and disk spacers,
finger rings, hairbands, ring- and cone-shaped earrings.



Kalibangan. A large number also comes from a few hoards, reportedly five in number, which have been recovered from Mohenjo-daro, Harappa, and Allahdino. One such hoard has also been reported

located in another part of the city

contained different styles, reflecting the desire for unique designs and

fingers have been a common ornament throughout

highlighting the artistic abilities of the

Sindh and Baluchistan till very recent times. Fifteen

Indus artisans. One necklace hasagate beads, a copper bead covered with gold foil

and a collection of twenty gold lumps and orna

hollow biconical gold beads and

from Lothal but not published. Miscellaneous Craftsments that had been folded up in preparation for

One jewelry hoard found in the HR area at barrel-shaped green stone beads with remelting, were also placed around the belt. The Mohenjodaro contained necklaces and chokers that jewelry hoard from Allahdino is much like others reportedly five in number, which have been recovered from Mohenjodaro, Harappa, and large jasper and agate pendant beads.

Allahdino. reveal the diversity of ornaments worn by some of found at Mohenjo-daro and Harappa, because it the wealthiest Indus elite. A gold-beaded choker includes complete ornaments as well as partly recy

necklace has six rows of beads with divider bars Fairservis discovered a sizable jewelrycled ornaments. It is possible that these finds repre One jewelry hoard found in the HR area at Mohenjodaro contained necklaces and and half moon-shaped terminal. Another multi- hoardsent the stock and partly processed materials of anear Karachi.

strand necklace has five strands of tiny gold, fa chokers that reveal the diversity of ornaments worn by some of the wealthiest Indus goldsmith, but it is unlikely that the small settlement

elite. A gold-beaded choker necklace has six rows of beads with divider bars and half Hidden and buried in a jar were gold, Partially excavated jewelry hoard from Allahdino moon-shaped terminal. Another multi(after Kenoyer) strand necklace has five strands of tiny silver, bronze, agate, and carnelian ornaments. gold, faience and steatite beads Of

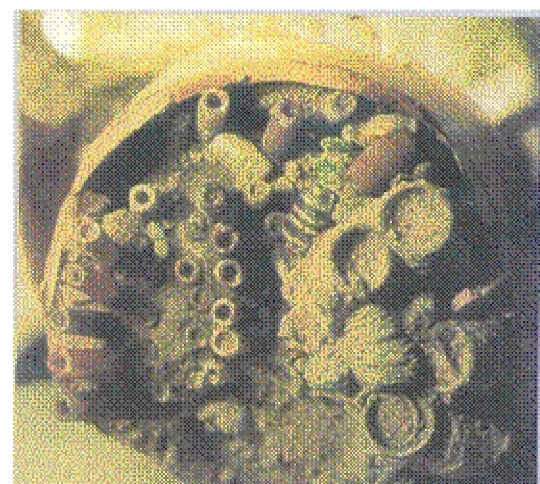
particular note was a massive belt or

terminated with a similar half moon

shaped end-piece. A separate hoard necklace of thirty-six long carnelian beads andlocated in another part of the city bronze spacers which had been folded tightly contained different styles, reflecting into the center of the jar. Only three such beltsthe desire for unique designs and have been discovered intact so far,each highlighting the artistic abilities of the representing the great wealth controlled by

Indus artisans. One necklace has

hollow biconical gold beads andsome individuals of the Indus cities. Stuffed barrel-shaped green stone beads with around this belt were two or three multi-strand large jasper and agate pendant beads. necklaces of silver beads, eight coils of silverFairservis discovered a sizable jewelrywire that may have been used as rings. These


hoard at Allahdino near Karachi.


rings were made of fourteen or eighteen coils Hidden and buried in a jar were gold, Partially excavated jewelry hoard from Allahdino A bead hoard from Harappa (after Kenoyer)

of wire and such wire rings for the toes orA bead hoard from Harappa (*Kenoyer*) fingers have been a common ornament silver, bronze, agate, and carnelian ornaments. of Allahdino supported such a jeweler. A more palu throughout Sind and Baluchistan till very recent times. Fifteen agate beads, a coppersible explanation is that the jewelry represents thehalf moon-shaped end-piece. A separate hoard lo

bead covered with gold foil and a collection of twenty gold lumps and ornaments

that

necklace of thirty-six long carnelian beads andcated in another part of the city contained different hereditary ornaments of a woman or her family that

had been folded up in preparation for remelting, were also placed around the belt. The Miscellaneous Crafts

bronze spacers which had been folded tightly 'highlighting the artistic abilities of the Indus artisans. Ornaments are worn for symbolic, ascetic,

jewelry hoard from Allahdino is much like others found at Mohenjodaro and Harappa, and ammuletic purposes. Symbolically, they serve

One necklace has hollow biconical gold beads and

because it includes complete ornaments as well as partly recycled ornaments. It isgoldsmith, but it is unlikely that the small settlement of Allahdino supported such a

representing the great wealth controlled by
as traditional outward markers of age, sex, social
Kenoyer and jeweler. A more plausible explanation is that the jewelry represents the hereditary some individuals of the Indus cities. Stuffed
believes that there were regional differences in the

possible that these finds represent the stock and partly processed materials of a

Meadow found a small pot buried underground at ornaments of a woman or her family that had been hidden away for safekeeping. Harappa. This pot contained a large number of way ornaments were used and discarded. Different
around this belt were two or three multi-strand types of ornaments were manufactured in various
stone beads and most likely belonged to the late
Harappan period.necklaces of silver beads, eight coils of silver
wire that may have been used as rings. These
Fairservis discovered a sizable jewelry hoard
More recently, Kenoyer and Meadow found in 1987 a small pot buried underground at material

qualities. This may suggest that the design



Harappa. This pot contained a large
number of stone beads and most likely bel;onged to

was of greater importance than material or that a
rings were made of fourteen or eighteen coils at Allahdino near Karachi. Hidden and buried in a the late Harappan period. design may have jar were gold, silver, bronze, agate, and carnelian
A bead hoard from Harappa (after Kenoyer)
had the same **Ear Ornaments:**
of wire and such wire rings for the toes or A variety of gold ear ornaments has fingers have been a common ornaments. Of particular note was a massive belt or meaning despite
necklace
of
thirty-six
long
ornament
carnelian beads and been found in some of the hoards, usually in pairs. One
bronze spacers which had been folded tightly into
throughout Sind and Baluchistan till very recent times. Fifteen agate beads, a copper
the status of the
example is dome-shaped with a circular depression in bead covered with gold foil and a collection of twenty gold lumps and ornaments that ing it.the center for inlay. The ribbed edging is made of had been folded up in preparation for remelting, were also placed around the belt. The **Ear Orna** great wealth controlled by some individuals of the and soldered onto the body jewelry hoard from Allahdino is much like others found at Mohenjodaro and Harappa, chiseled wire A variety **ments:** ornament. The hollow post is joined with mastic andIndus cities. Stuffed around this belt were two or



of gold ear or
because it includes complete ornaments as well as partly recycled ornaments. It is
three multi-strand necklaces of silver beads, eight Faience ear studs or buttons, may have had a cotton plug to keep the stud from falling
possible that these finds represent the stock and partly processed materials of a been found in coils of silver wire that may have been used as and grooved faience ornament rings. These rings were made of fourteen or eight(after Kenoyer)een coils of wire and such wire rings for the toes or
Page 425
of the ear cavity. Faience ear ornaments were made with

some of the a wide knob on the back to hold them firmly in the ear
hoards, usually

lobe.

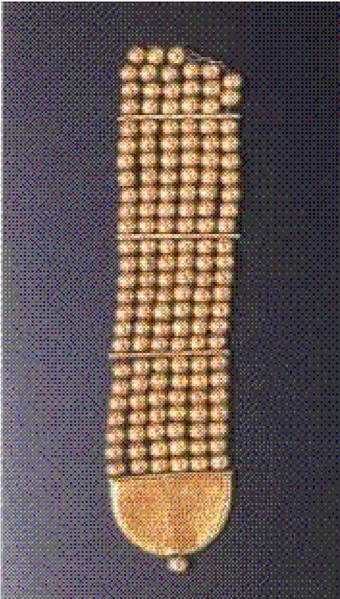




Terracotta animal figurines abound in the remains of the Hasrappan Civilization; some of them are really artistic.
Terracotta and faience are the media for forming, molding and in one instance carving animal figurines. Monkeys, squirrels, rams, are goats are common representations but
Indus artisans working

in pairs. One example is dome-shaped with a cir ornament has a tiny loop on the inside that could be
cular depression in the center for inlay. The ribbed
typical example. One gold fillet found in a house at Mohenjodaro has holes at both ends
threaded with a strand of hair or attached to aIndus Art! edging is made of chiseled wire and soldered onto
for holding a cord, and each end is decorated with a punctuated design depicting the
headband. Fifty-four smaller gold caps were found
the body of the ornament. The hollow post is joined
ritual offering stand (see the chapter on religion and that on seals) that is commonly
in the same hoard that may have been sewn onto
with mastic and may have had a cotton plug to keep
seen on the unicorn seals. Some of these fillets have tiny holes all along the edge to
clothing or a belt. One famous terracotta figurine of
the stud from falling of the ear cavity. Faience ear
attach beads or pendants, and others are made with curved shape
identical to hair
a bearded male is shown wearing a skirt or wide ornaments were made with a wide knob on the back
ornaments worn throughout Pakistan and Afghanistan today.belt covered with conical projections that may have been just this type of golden cap.

Inlay Jewelry: The most elaborate example of inlay


A gold hair ornament from Mohen

A gold hair ornament

jodaro

from Mohenjo-daro


Pendant or hair ornament made Miscellaneous Crafts**Pendant or hair ornament made**

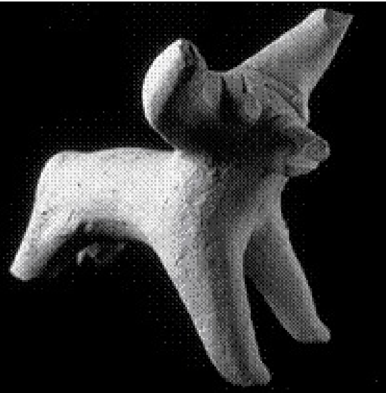
carnelian and gold, from

of **of carnelian and gold, from**

Gold fillets appear to have been a common decorating gold ornaments is composed of mentiny and women. All carved stone sculptures from Mohenjo
steatite, faience and gold beads: this was found at
daro show a straight fillet around the forehead that
Harappa. Two identical spiral ornaments along with a

was probably made of gold and tied with a cord at kidney-shaped piece that may have been attached to a
the back of the head. The band appearing around

headband or a belt as brooches were found on Mound F
the forehead of the 'priest king' is a typical example.
at Harappa. Although much of the inlay has fallen out,
One gold fillet found in a house at Mohenjo-daro
the double-spiral brooch has a design made with two has holes at both ends for holding a cord, and each



lines of blue black glazed steatite and gold bead inlay. end is decorated with a punctuated design depicting Terracotta animal figurines abound in the remains of the Hasrappan Civilization; some of them the ritual offering stand (see the chapter on religion
Such use of inlaid components to formare really artistic.complex and that on seals) that is commonly seen on the
ornaments further demonstrates the artistic creativity of
the Indus artisans. unicorn seals. Some of these fillets have tiny holes
all along the edge to attach beads or pendants, andTerracotta and faience are the media for forming, molding and in one instance carving
others are made with curved shape identical to hair
Other types of inlaid ornaments used single pieces.

animal figurines. Monkeys, squirrels, rams, are goats are common representations but goldsmith, but it is unlikely that the small settlement of Allahdino supported such a *Kenoyer*)
jeweler. A more plausible explanation is that the jewelry represents the hereditary Miscellaneous Crafts!
ornaments of a woman or her family that had been hidden away for safekeeping.

ornaments worn throughout Pakistan and Afghani
Harappa (after Kenoyer) Such as the ribbed faience disc from Harppa that may
Page 501 stan today.have been set into a copper ornament or sewn onto

Jewelry as an Artistic Expression of Cultural Taste

goldsmith, but it is unlikely that the small settlement of Allahdino supported such a
More recently, Kenoyer and Meadow found in 1987 a small pot buried underground at
to hold them firmly in the ear lobe.jeweler. A more plausible explanation is that the jewelry represents the hereditary clothing.
Another form of inlay used flat, polished pieces of carnelian set in gold to Harappa. This pot contained a large number of stone beads and most likely bel;onged to
ornaments of a woman or her family that had been hidden away for safekeeping.
the late Harappan period. **Hair Ornaments:** Terracotta figurines, repreaccentuate the translucent qualities of the stone.
Numerous inlaid shapes, such as senting the ladies of the Harappan society, have**Ear Ornaments:**More recently, Kenoyer and Meadow found in 1987 a small pot buried underground at
Harappa. This pot contained a large number of stone beads and most likely bel;onged to
A variety of gold ear ornaments has

been found in some of the hoards, usually in pairs. One droplets or circles, have been found at both Mohenjodaro and Harappa, but we do notbeen shown wearing an extensive array of hair jew
example is dome-shaped with a circular depression in know how these were incorporated into ornaments. The discovery of a completeelry. Most of ornamentation is in the form of tiara but
the center for inlay. The ribbed edging is made ofpendant at Harappa in 1987, does give us some idea about it. This

flat, drop-shaped a few have been discerned as dangling ornaments.of the



ornament. The hollow post is joined with mastic and carne-lian inlay is held by a gold frame that has a deep channel on the exterior. Traces Some actual specimens, recovered from Harappa
Faience ear studs or buttons, may have had a cotton plug to keep the stud from falling of black mastic present in the channel suggest that it once contained inlay, possibly tinyand Mohrenjodar, are difficult to place if they were of the



(after Kenoyer)
Faience ear studs or buttons,
and grooved faience ornament

(after Kenoyer)
a wide knob on the back to hold them firmly in the ear
lobe. may have had a cotton plug to keep the stud from falling beads of steatite, faience, or even lapis lazuli. This ornament may have been worn on a

of the ear cavity. Faience ear ornaments were made with necklace or possibly in the middle of the forehead, recalling the red vermilion that was a wide knob on the back to hold them firmly in the ear
lobe. used to decorate the part of the hair in earlier figurines.





Forehead Ornaments: The use of forehead ornaments is clearly represented in the
A fine specimen of Indus inlay. Double spiral brooch with
many terracotta female figurines. but usually these were conical shaped and were



A fine specimen of Indus inlay. Double spiral brooch with

probably made of gold or silver, like the large cone-shaped gold ornament found in one

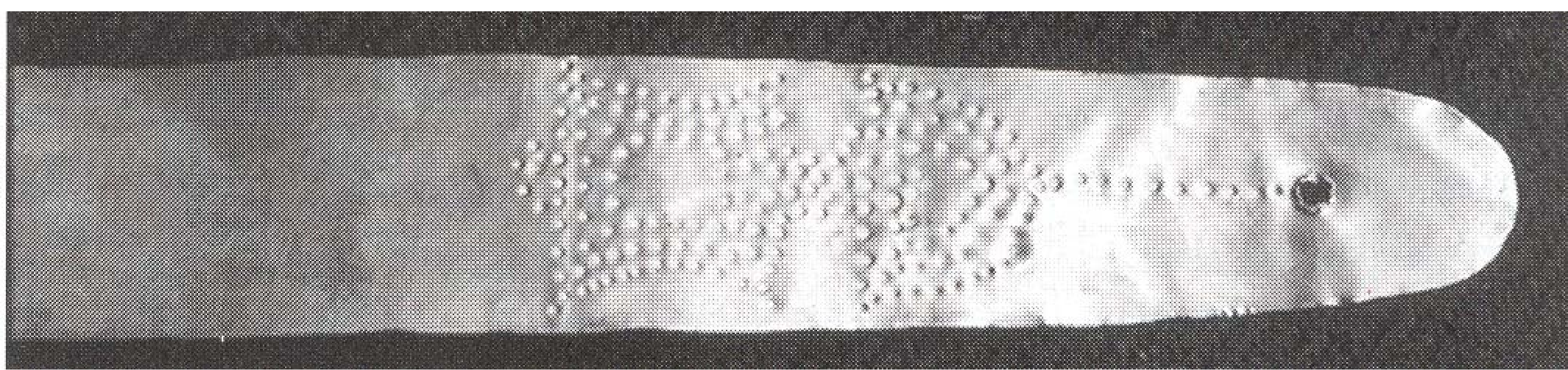


of the hoards from Harappa. This conical ornament has a tiny loop on the inside that Jewelry and personal ornaments often reflect the could be threaded with a strand of hair or attached to a headband. Fifty-four smaller artistic taste of a culture. Harappan jewelry has been Detail of gold fillet with punctuated design of ritual stand at both ends (after Kenoyer) **Inlay Jewelry:** The most elaborate example



gold caps were found in the same hoard that may have been sewn onto clothing or a of inlay decorating gold ornaments is composed of**Straight and curved gold fillets (***Kenoyer***)**

Detail of gold fillet with punctuated design of ritual stand at both ends (after Kenoyer) little attention has so far been paid to its aesthetic and belt. One famous terracotta figurine of a bearded male is shown wearing a skirt or wide artistic dimensions. Some of the Indus jewelry is tiny steatite, faience and gold beads: this was found at Harappa. Two identical spiral ornaments along
belt covered with conical projections that may have been just this type of golden cap. extremely appealing to the eye and quite innovative

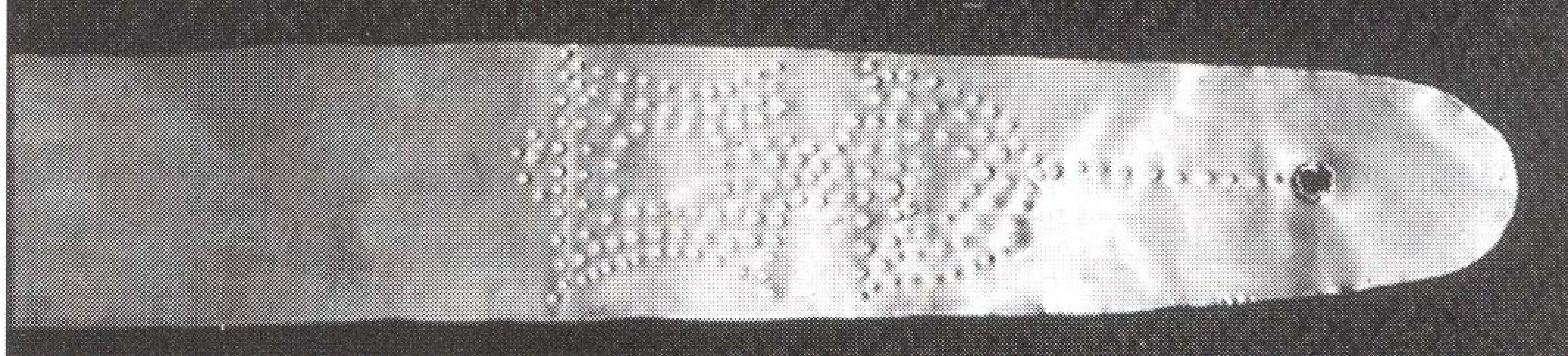


with a kidney-shaped piece that may have been

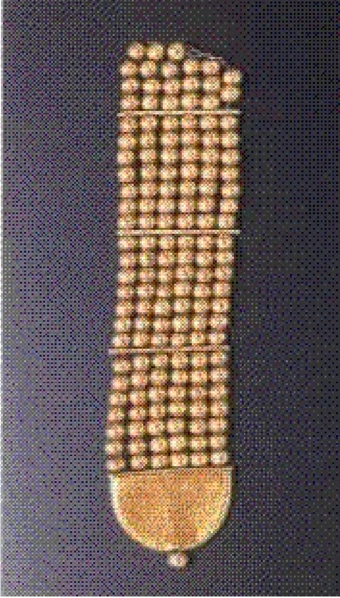
Beaded Jewelry: Complete ornaments from the Indus culture are spectacular but each attached to a headband or a belt as brooches were

found on Mound F at Harappa. Although much of Indus artisans working individual bead used in these ornaments is itself a work of art and technological

Straight and curved gold fillets (after Kenoyer) the inlay has fallen out, the double-spiral brooch



prowess. Throughout Asia the red orange carnelian is a symbol of blood, power and



A gold hair ornament from Mohen

Hair Ornaments: Gold fillets appear to have been a common form of hair ornament worn by both men and women. All carved stone sculptures from Mohenjodaro show a

Detail of gold fillet with punctuated design at both ends straight fillet around the forehead that was probably made of gold and tied with a cord at the back of the head. The band appearing around the forehead of the 'priest king' is a **( )**

worn by both men and women. All carved stone sculptures from Mohenjodaro show a

straight fillet around the forehead that was probably made of gold and tied with a cord at

the back of the head. The band appearing around the forehead of the 'priest king' is a in fact hair ornamentation or neckwear.

Forehead Ornaments : The use of forehead ornaments is clearly represented in the many terracotta female figurines. but usually these were conical shaped and were probably made of gold or silver, like the large cone-shaped gold ornament found in one of the hoards from Harappa. This conical

has a design made with two lines of blue black
glazed steatite and gold bead inlay. Such use of

 inlaid components to form complex ornaments further demonstrates the artistic creativity of the Indus artisans.

Other types of inlaid ornaments used single pieces such as the ribbed faience disc from Harppa that may have been set into a copper ornament or sewn onto clothing. Another form of inlay used flat, polished pieces of carnelian set in gold to accentuate the translucent qualities of the stone. Numerous inlaid shapes, such as droplets or circles, have

439 been found at both Mohenjodaro and Harappa, but we do not know how these were incorporated into ornaments. The discovery of a complete pendant at Harappa in 1987, does give us some idea about it. This flat, drop-shaped carne-lian inlay is held by a classes, imitation eye beads were made of terracotta or fired soapstone with red-and--white paint, materials more affordable for the common classes. Some examples imitate the lenticular single eye beads, and tohers imitate the rare orbicular jasper

to heat
natural
and
imitations laminating
spotted or

gold frame that has a deep channel on the exterior.!
Traces of black mastic present in the channel sug

gest that it once contained inlay, possibly tiny beads took great care to bring out unique patterns of
eye designs. of steatite, faience, or even lapis lazuli. This orna

ment may have been worn on a necklace or possi
bly in the middle of the forehead, recalling the red

Whereas the bleached carnelian and faience

vermilion that was used to decorate the part of the

hair in earlier figurines.beads were probably made for the wealthier
classes, imitation eye beads were made of

the Indus culture are spectacular but each individual

terracotta or fired soapstone with red-and--white

bead used in these ornaments is itself a work of art

paint, materials more affordable for the common

and technological prowess. Throughout Asia the red
orange carnelian is a symbol of blood, power and

classes. Some examples imitate the lenticular

fertility while blue green turquoise and stones with

single eye beads, and others imitate the rare

natural eye designs are commonly used to ward off

orbicular jasper that has a red matrix and white

the evil powers, especially the evil-eye. Indus bead

circles. Others were made makers developed special techniques to heat cartransverseA selection of beaded and gold jewelry from Mohenjodaro and Harappa with spiraling bands to imitate natural banded agate. The reproduction of identical shapes and styles using different raw materials helps to unify people within a single culture and belief system, even though not everyone enjoys the same wealthNecklace made up of paper-thin or status. Even today many people wear imitation flat gold disc gemstones as symbols of beauty or wealth, but beads, interonly the affluent wear real gems.

spaced with
beads of onyx,

Bangles: One of the most prevalent ornament turquoise and type used by the Harappans was the bangle. Theybanded agate, were manufactured from various

recovered from a

materials jewelry hoard at



including copper/bronze, silver, stoneware, and terracotta. Shell bangles were manufactured from two types of shelfish: conch bangles were the most prevalent. Bangle
A hoard or stockpile of jewelry at Mofaience, gold, shell, Mohenjodaro A hoard or stockpile of jewelry at Mohenjo

henjo-daro contained this valuable
(after Kenoyer)
daro contained this valuable necklace made up necklace made up of gold beads com
of gold beads combined with beads of agate,
bined with beads of agate, jasper,
jasper, steatite and green garnet (*Kenoyer*)steatite and green garnet (after Kenoyer)

were artisans styles demonstrate how the Indus



produced ornaments that served to
unite as well as to differentiate the various

natural banded agate. The reproduction of identical

communities living in the cities. From the Harappan Phase, we see bangles primarily on shapes and styles using different raw materials

Necklace made up of paper-thin flat gold disc beads,

female figurines and in female burials, although some males do appear to have worn helps to unify people within a single culture and be

Page 428 **banded agate, recovered from a jewelry hoard at** lief system, even though not everyone enjoys the

Mohenjodaro (*Kenoyer*)bangles. Bangles were generally worn on the arms, but circlets that look like banglessame wealth or status. Even today many people were also worn in the hair, on belts, on the ankles or sewn onto clothing. When worn onwear imitation gemstones as symbols of beauty or
the arms, three or four bangles were often placed on the wrist and two or more bangleswealth, but only the affluent wear real gems. nelian to deepen the red color. and they were skilledBangles: One of the most prevalent ornaat bringing out the nautral designs of banded agate. above the elbow, usually with equal numbers of bangles worn on both arms. A slightly

Beads with horizontal banding and vertical banding
ment type used by the Harappans was the bangle.

modified pattern is depicted on the famous bronze figurines from Mohenjodaro, where were skillfully prepared from natural agates. and They were manufactured from various materials

including copper/bronze, faience, gold, shell, silver,

occasionally imitations were made by laminatingseveral bangles were worn on the right arm at the wrist and elbow, but the left arm was filled with bangles from wrist to shoulder.

different colors of shell and stone. Because spotted
or banded stones with designs resembling an eye
stoneware, and terracotta. Shell bangles were manufactured from two types of shelfish: conch bangles were the most prevalent. Bangle styles

were especially popular, artisans took great care toAlthough figurines and seals show how bangles were worn, they do not permit

bring out unique patterns of eye designs.
demonstrate how the Indus artisans produced or

identification of the types of bangles or the combinations of design and color. The only

Whereas the bleached carnelian and faience
naments that served to unite as well as to differentiate the various communities living in the cities.

beads were probably made for the wealthier bangles found in the cemetery excavations at Harappa are white shell bangles that were worn on the left arms of middle-aged adult women. The bangles in the earliest burials,

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around 2600 B.C. are slightly wider than those found in later burials, about 2400 B.C., and the thinnest bangles are found in the latest burials around 2000 B.C. The decreasing
artisans that has a red matrix and white circles. Others were

made with transverse spiraling bands to imitate **bangle, Harappa (**

width of shell bangles worn by women buried in the cemetery at Harappa may

indicate that over several generations these women became less and less involved in heavy

manual Iabor. Thin-shell bangles are easily broken when chopping wood or loading

From the Harappan Phase, we see bangles primar
ented in the same direction. There is only one ex

oxcarts, whereas wide, heavy shell ornaments stand up to repeated battering. At

ily on female figurines and in female burials, alample of a middle-aged adult male with a broken

though some males do appear to have worn banHarappa and many other Indus sites, wide shell bangles have been found in variousgles. Bangles were generally worn on the arms, but left wrist. None of the individuals buried at Harappa

circlets that look like bangles were also worn in the

neighborhoods, but never in the burials. These wide shell bangles are also incised with

or any other reported site has been found wearing

hair, on belts, on the ankles or sewn onto clothing.the standard Indus chevron, but they may have been worn by women who were involved

Such ornaments may have been removed or broken



Faience bangle made in the

Faience bangle made in the shape of a shell

shape of a shell bangle, *after Kenoyer*)
Harappa (after Kenoyer) in heavy labor, as is common among nomads or farmers

Hindu rituals. Shell bangles appear to have been

today. However, even though the width of the bangles

used as a symbol that expressed an overarching

changed, all were incised with the same style of chevron

tions. The distinctive style of shell bangles with in

motif oriented in the same direction. There is only one

cised chevron design are found at most settlements of the Harappan Phase, but the limited quantity of

example of a middle-aged adult male with a broken shell

such bangles indicates that they were not available

bangle that appears to have been worn on the left wrist.

The extensive manufacture and use of other

None of the individuals buried at Harappa or any other

types of bangles in contexts outside of burials is

reported site has been found wearing terracotta, faience,

made in a variety of styles and widths. Wide, white

copper or stoneware bangles, Such ornaments may have

cised on the exterior imitated shell bangles. A more

been removed or broken at death, a practice that became

common style is the blue green glazed bangle

common in later Hindu rituals. Shell bangles appear to

designs repeated around the entire circlet. The fin

been used as a symbol expressed est design of faience bangle is a kidney or wombthat
have overarching unity as well as gender and possibly ethnic

bangles with the exterior decorated by deeply

When worn on the arms, three or four bangles were distinctions. The distinctive style of shell bangles with

often placed on the wrist and two or more bangles
the most common and the most varied. Thousands

incised chevron design are found at most settlements of the Harappan Phase, but the

above the elbow, usually with equal numbers of
of bangle fragments have been recovered from the

limited quantity of such bangles indicates that they were not available to all members of

bangles worn on both arms. A slightly modified pattern is depicted on the famous bronze figurines from

the Indus society.!

Mohenjodaro, where several bangles were worn on the right arm at the wrist and elbow, but the left arm was filled with bangles from wrist to shoulder.

The extensive manufacture and use of other types of bangles in contexts outside of

bangles range from wide to narrow and plain to

burials is also quite significant. Glazed faience bangles were made in a variety of styles
gles were worn, they do not permit identification of modified by pinching, incising or painting. Red or the types of bangles or the combinations of designand widths. Wide, white glazed faience bangles with a single chevron incised on the

and color. The only bangles found in the cemetery
black pigment was commonly used to make diago

exterior imitated shell bangles. A more common style is the blue green glazed bangle excavations at Harappa are white shell bangles that were worn on the left arms of middle-aged adult bangle. decorated with multiple chevron and herring-bone designs repeated around the entire women. The bangles in the earliest burials, around Mostterracottabangleswereformedby

hand, but those made on a potter's wheel are per

circlet. The finest design of faience bangle is a kidney or womb-shaped circlet, imitating 2600 B.C. are slightly wider than those found in fectly circular and have graduated diameters to fitlater burials, about 2400 B.C., and the thinnestthe shape of some shell bangles with the exterior decorated by deeply carved cogs orbangles are found in the latest burials around 2000 gle was always made the same size, between 5.5B.C. The decreasing width of shell bangles worn by ribbing. Terracotta bangles are both the most common and the most varied. Thousands

women buried in the cemetery at Harappa may in
and 6 cm interior diameter with a highly burnished

of bangle fragments have been recovered from the recent excavations at Harappa, and dicate that over several generations these women ally referred to as stoneware bangles because they became less and less involved in heavy manualthousands more are scattered over the surface of the mounds. Many terracotta circles Iabor. Thin-shell bangles are easily broken when dardized ornaments were almost always inscribed were setters for firing pottery, distinguished from bangles by crude shape. As with the chopping wood or loading oxcarts, whereas wide, on the outside edge with minute signs of the Indus heavy shell ornaments stand up to repeated battershell and faience ornaments, terracotta bangles range from wide to narrow and plain to ing. At Harappa and many other Indus sites, wide made, probably to be worn as a badge of office or shell bangles have been found in various neighborhighly decorated. The surfaces were sometimes modified by pinching, incising orhoods, but never in the burials. These wide shell ritual ornament. Since they were made in standard

ized sizes that would not have fit a large hand, it is

bangles are also incised with the standard Indus painting. Red or black pigment was commonly used to make diagonal lines or a single

chevron, but they may have been worn by women

wide band on the exterior of the bangle.

possible that they were attached to a necklace or
worn in the hair instead.
who were involved in heavy labor, as is common While ceramic and shell bangles were inamong nomads or farmers today. However, even variably made as circlets in order to improve their

Most terracotta bangles were formed by hand, but those made on a potter's wheel are though the width of the bangles changed, all were strength, metal bangles usually had an open edgeincised with the same style of chevron motif oriperfectly circular and have graduated diameters to fit different sizes of hands. However,

one style of bangle was always made the same size, between 5.5 and 6 cm interior diameter with a highly burnished surface fired to a red or a gray black color. Generally

more are scattered over the surface of the mounds.
Many terracotta circles were setters for firing pottery, distinguished from bangles by crude shape. As with the shell and faience ornaments, terracotta

to slip over any size of wrist. Copper or bronze bangles were generally made as solid bars curved to fit the shape of the wrist , but some examples are hollow, making a lighter and yet equally impressive ornament. Gold bangles always had a hollow core to be easily twisted open and shut to fit over the wrist or ankle.

From terracotta to stoneware and gold, bangles made from various raw materials were worn by men, women. and children in all of the far-flung settlements of the Indus region. Some styles were only found at the largest cities, and specific styles may have changed over time, but once the tradition of wearing bangles was established during the Neolithic period, about 6500 B.C., it remained an important form of symbolic ornamentation throughout the subcontinent. Today, throughout India, children wear specific types of bangles as amulets for health and to enhance beauty. A young woman wears bangles during courtship, and at marriage these bangles are replaced by different types of bangles to symbolize her changed status. Throughout a woman's life, bangles are worn as ornaments and also to protect and preserve her family's well being. These bangles are removed or broken at the death of her husband, and all valuable ornaments are passed on to subsequent generations. Men often wear bangles for physical protection in battle, for amuletic purposes, for defining status and ethnic affiliation and simply as ornaments. Bangles of gold, silver and glass are also common in Pakistan and Afghanistan but they are worn only for ornamental purposes, not for any ritual significance. Of course, the faqueers are exception: some of them wear thick bangles for associational purposes.

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Chapter 20

Civilizational Decay and the post-Harappan Cultures



The Indus civilization flourished for about five hundred to seven hundred years. In the early second millennium BC it started wilting and eventually came to an end. This process was marked by the disappearance of the features that had distinguished the Harappan Civilization from its predecessor cultures: writing, city dwelling, some kind of political control, regional and international trade, occupational specialization, and widely distributed standardized artifacts. Local materials started to be used for objects like stone tools, and the cultural uniformity of the Indus Tradition gave way to a number of regional groupings, often using material reminiscent of that belonging to the pre-urban phase in each area. While there was considerable depopulation in the Indus heartland, settlements increased in number in Gujarat, and other communities were established in areas well outside those occupied by the Harappan people, particularly in the east.

Early in the second millennium BC, by about 1800-1900 BC, the city of Harappa and its counterpart in Sindh, the grand city of Mohenjodaro, were no longer functioning urban centers. The Indus Civilization sharply declined and eventually came to an end as a complex socioeconomic system. Human life continued on the plains and the hilly slopes of the surrounding area but the people were no longer organized by class and occupational specialization. While there was continuation of life, there was also much change. The people seemed to adopt new customs and living habits, their beliefs apparently changed, and what little we know about this period, some new peoples started to make inroad into the Indus territories and under their influence the Indus languages probably started to change. Gone were the town planning, gone were the sewage system, gone were the square seals, gone was the script, and gone was the Indus style in pottery form and decoration.

The archaeological phenomena we identify as Harappan - baked brick houses, steatite seals carved in intaglios with high, pierced bosses, weights of a specific and uniform standard, long cylindrical carnelian beads, and sturdy red pottery in a set of recognizable shapes among other features - cease to appear in the archaeological record of the centuries between about 1900 and 1700 BC. As stated, the distinctive pottery with ritual motifs and Indus script and traditional square seals with unicorn and other animal motifs disappeared. Cubical weights for taxation and trade fell into disuse, and the international trade networks began to deteriorate. Shells from the coastal regions no longer made their way to the northern sites, and lapis lazuli from the north failed to reach the sites in the plains. In Mesopotamia the texts that had recorded ongoing trade with a region called Meluhha, which is most probably the Indus Valley, no longer mentioned it. Additionally, a very large percentage of Harappan villages and towns were deserted during or before that period, so that no vestiges of subsequent cultures are to be found at them. Along with this all, there were no more trade caravans going northward and there were no ships sailing to Delmun or to Mesopotamia.

The disintegration of the urban culture means the end of an integrated and complex social, economic

and political system, carrying with it a decline in social stratification, erosion of economic specialization, the eclipse of regulatory institutions and the flow of information, the city life that embodies the sophistication of the civilization, and, ultimately, what Tainter (1) calls the epiphenomena: the public monuments and art production. Paradoxically, it is often these 'epiphenomena' by which ancient civilizations are known to us, and it is their disappearance in the archaeological record which we miss with this civilizational collapse (2).

What happened? There is no one answer to this question. The issue is still being debated and is one of the topics of Volume IV (*Theoretical and the Abstract*). In the meantime, what can we say is as follows: The Indus civilization arose as a social, economic and cultural phenomenon, produced by the build-up of population on the fertile Indus plains and the hilly slopes of the surrounding areas in the west. The resultant urban society was a delicate balance of internal relations between cities, towns and villages, and of external relations with neighboring peasant and pastoral societies and more distant urban cultures. The end of the Indus urban phase was probably triggered by some major upset of this balance. Such an upheaval could have been produced by any one or more of the causes one can imagine, operating either alone or in combination. In other words, just as the creation and maintenance of the system was the outcome of the successful combination of several factors, so too its breakdown could have been caused by the weakening of anyone of these or the upsetting of their harmonious balance and interaction. Whatever they may have been and what from our point of view is of primary concern, it is obvious that at a certain point in time the urban phenomenon came to an end. There is no use in calling it a ‘transformation’ as some of our recent archaeologists are prone to do (3,4,9). Civilizations arise; they also fall and come to an end. So was the Harappan Civilization or the whole Indus Age (2).

The decay and demise of the Harappan Civilization is evident from a visible change in the material record. First, numerous Harappan settlements in the core areas of the Greater Indus Valley (Sindh, Punjab and the Cholistan) are abandoned. For example, from Mughal’s survey in the Hakra Valley (5), it appears that out of 83 Harappan habitation sites, only one continued to be occupied and 27 new settlements were established in the later period; a far smaller range of raw materials, and that too more locally available, appears to have been utilized. Along with it, the diversity of types of artifacts decreases. It appears as though the civilization has taken a giant step backward.

Often the material excavated is reified and equated with 'a people' in the sense that the people who now occupied the Greater Indus Valley were different from those who created the magnificent material objects of the Harappan Civilization. When Harappan artifacts were first found in Gujarat, for example, it was thought that 'the Harappans' had migrated there as refugees. It was not realized that the presence of Harappan artifacts there could mean the extension of the Harappan socioeconomic system - for example, the spread of a certain method/organization of pottery manufacture - to that region. Similarly, when typical Harappan objects disappeared from archaeological record, it was assumed that the “Harappans” had emigrated from the area and some new peoples had arrived. The fact is, however, that what we call Harappan material culture is not the same thing, and cannot be coterminous with a an ethnic identity or breeding population in the biological sense. Thus, in the study of post-urban culture, our focus of attention should not shift to ethnicity or exclusively fixed to demography.

The Harappan Civilization collapsed but we should not assume that all aspects of life associated with the Harappan culture came to an end. The aspects related to the urban living did disappear, but others,

connected with basic subsistence practices or agricultural technologies seem to continue. Those social institutions that were created to forge ties between non-kin and between distant settlements crumbled but the remnants of the tribal institutions that we note in the pre-urban cultures continued to exist.

Archaeological studies, recording the cultural changes in the terminal phase of the Harappan Civilization is an interesting subject, so is the musing about the non-urban regional cultures that replaced this splendid civilization. This chapter deals with these two topics in some essential details. The speculation on the causes of the decay and demise of the Harappan Civilization - asking the question: What happened and Why - is even more interesting exercise. Related to these speculations is the research on the legacy of the Indus Age and its shadow on the subsequent cultural development within Pakistan and the peripheries in the present day India on one hand and Afghanistan and Iran on the other. These topics, bordering on theory and the abstract, are to be revisited in the next volume (Volume IV. *Theoretical and the Abstract*); here we address only the changes in the material culture.

The later part of the Harappan Civilization and its eventual demise was a momentous period in the history of ancient Pakistan and a new cultural beginning in India. Not much has, however, been written on the decay and decline of the Harappan Civilization or, more recently, on the 'transformation' of the Indus culture from an expansive urban society to a number of regional cultures which took a long time to be on the road of civilization again. Most of this material deals with the 'causes' of decline rather than the process of cultural transformation from an urban society to a collection of some degenerated pre-urban cultures. Economic imperatives are extensively discussed but these analyses give pride of place to natural calamities such as floods or to radical environmental changes as forces behind the end of the civilization. Furthermore, the issue of *why* and *how* has been commented on without putting it in a larger context of the cultural upheavals that many Bronze Age civilizations were experiencing at the same time period throughout the Old World.

This situation is reflected in the fact that while scores of book-length commentaries have appeared in the past half a century on the gemination and blooming of the Indus Civilization, only one (2) has appeared that deals with the wilting of this cultural phase. Another (6) is a collection of already published parers and is only obliquely relevant. This paucity of archaeological and interpretative literature is probably the result of the scarcity of archaeological research in the final phase of the Harappan Civilization and the ensuing of a long "Dark Night" of the subcontinental prehistory. Indeed, this presumed 'dark' period is oftentimes offered as an excuse for the obvious neglect of paying attention to the decay and decline of the Harappan Civilization and the eventual end of the Indus Age. In spite of this criticism, there is enough material available that allow us to have a floating peek into this period of momentous importance. In this chapter, we confine ourselves to the material change in the Harappan Civilization and a few regional or local cultures that replaced the high culture of the Indus society. It should be noted that a large part of the material covered in this chapter is abstracted from Ratnagar (2), augmented by several stray articles by other researchers to which running references will been provided as we precede.

The Problem of Definition and Terminology: There is much confusion in the terminology of the Harappan Civilization and its aftermath. Two terms are frequently used to describe the time period after the decay and demise of the Harappan Civilization, i.e., the *Late Harappan* and the *postHarappan*, and both of these terms have been used without differentiation. Ideally, the Late Harappan should be used to describe the transition from the urban phase to a non-urban cultural

complex and the post-Harappan should be used for the nonurban cultures that followed the end of the Harappan Civilization. It is a more general term and, by connotation, it excludes the transition period from Harappan to post-Harappan. However, this simple conceptualization is also not free from confusion or at least from precision. Was it a civilizational collapse or was it merely a “cultural transformation”, called the “localization Era” by some? The former interpretation reflects the dominant influence of the cyclic model of cultural development: what is born must eventually die. Rarnagar (2) is one of those scholars who subscribe to this point of view. Shaffer (12) and many others (3,9,13) employ the term 'Localization Era' to denote the Lateand postHarappan landscape as a breakdown of the centralized authority into a series of local, regional patterns but still retaining the essential features of the Greater Tradition’. In their opinions culture transformation is a continuous process with a varying degree of intensity and involves factors like human adjustments to prevailing environmental and social conditions of the region. Culture change is also multidirectional and the degree and nature of change vary in time and space.

In this chapter, we fully subscribe to the notion of the “decay”, “disintegration”, and the “end” of the Harappan Civilization. This approach differs from that of hSafer (12) Malik (13) and Possehl (9), who emphasize the survival of Harappan traditions (disconnected ones, it may be noted), such as the bullock carts, the binary-decimal system of measurement, written signs, and the scored goblets. Possehl doubts that stratigraphic dead ends (the termination of a certain kind of material culture in the vertical sequence of a site) mean the end of tradition: “a state it was that died”, he argued in 1979, “not the Harappan Civilization or its pottery and other material constituents”. In contrast, Ratnagar (2) argues that, in spite of dismissing demographic collapse, the civilization did indeed come to an end. Certainly some pottery forms, oral traditions, village cults, and the rural sciences of land use entailing knowledge of seed types, animal behavior, and climatic conditions, did not go into oblivion. “But however many such elements we count as 'survivals', they are not tantamount to an integrated Bronze Age political economy” (2).

Chronology: The chronology of the decay and demise of the Harappan Civilization is pretty much in dispute, as is its beginnings. Many aspects of the problem are related to the almost casual definition of the “Harappan”, sometimes innocently but oftentimes deliberately, by some archaeologists, such as Lal, Rao, Joshi, Dishkit, and their students, who have excavated in Gangetic Divide. Some particularly Possehl, Kenoyer, Meadow, and before them, Dales, are also casual in their approach and have unwittingly followed the Iead of the indigenous scholars of India. Obviously, as long as the criteria of the Harappan Civilization is not fixed and consistently adhered to, there is no hope that the date on the tail end of the Harappan Civilization could be fixed in any meaningful manner. There is the Early Harappan (the pre-urban period), there is the Harappan (the Mature phase) and there is the “Late” or post-Harappan (post-urban cultures) and they are not the same.

Another difficulty in the chronology of the Harappan Civilization is that it did not disappear suddenly, and many elements of this civilization can be found in later cultures. Some archaeological data suggest that material culture classified as Late Harappan may have persisted until at least *ca.* 1000-900 BC and was partially contemporaneous with the Painted Grey Ware culture. Recent work at Harappa has clearly demonstrated that during its late phase, from 1900 to 1300 B.C., Harappa was indeed inhabited. Now, at what point in time, the Harappan Culture ceased to exist and what are the criteria for determining this point? Some archaeologists have emphasized that, just as in many areas of the world, there was a continuous series of cultural change, without any cultural break. If that is so, then the whole idea of chronology goes out of the window.

In spite of the gradual decline of the urban culture at large cities, especially at Harappa, the fact remains that a large number of settlements in the core area were abandoned within a short time, roughly around 1800 BC, and the Harappan Civilization came to a virtual end. This date is supported by the fact that the Mesopotamian literature stops referring to Meluhha by the end of 1900 B.C. According to these opinions, the site of Harappa indeed continued to be inhabited but it shrank from a large city to one of a small, insignificant village. Signs that drain and city walls were not maintained provide proof of a breakdown of civic order. The archaeological remains also suggest that the ruling elites were no longer able to control the day-to-day functioning of this former urban center. Houses made of old dilapidated bricks and shoddy construction encroached upon the roads and streets of the towns. Flimsy partitions sub-divided the courtyards of the houses. The cities were fast turning into slums.This loss of authority must have eventually led to reorganization of society, not just in Harappa Gujarat and the Indowestern archaeologists, but throughout the entire region that the upper classes had dominated for 700 years.

Similar changes were taking place during the same time period elsewhere. A detailed study of the architecture of Mohenjo-daro, for instance, shows that many entry points to the 'Great Bath' were blocked. Sometimes later the 'Great Bath' and the 'Granary' fell into total disuse. At the same time the late levels (i.e. later habitations) at Mohenjo-daro showed a distinct reduction in the number of sculptures, figurines, beads, bangles and inlay works. Towards the end, the city of Mohenjo-daro shrank to a small settlement of three hectares from the original eighty-five hectares. If we take these criteria to designate the end of an urban culture, then we should not have any qualms to fix an approximate date of the “end” of the Harappan Civilization as 1700-1800 BC, in the core area at least. The decaying process in the Indus sites in Kutch and Gujarat was somewhat different, it started a little later and prolonged a little longer. In fact, here the process seemed more like a ‘transformation’ rather than an end.

Final Phase of the Harappan Urbanism: The final phase of the Harappan Civilization, the socalled Late Harappan period, is a murky time period because of its transitional nature - a transition from the urban to the post-urban cultures - and hence difficult to define precisely in cultural or chronological terms. But the broader outlines are clear and the overall picture is not as fuzzy as it has been often portrayed.

The idea of devolution and, therefore, a Late phase of the Harappan Civilization was first expressed by N.G. Majumdar in 1928 at the site of Jhukar by identifying a pottery type which was in certain ways different from the Mature Harappan. At the same time, the cultural strata representing the Jhukar type of pottery showed occupational and cultural continuity of the earlier Mature Harappan tradition. Similar situations also prevailed at Arnri and Chanhu-daro. Mackay later pointed out that in the late phases of Mohenjo-daro the structural data were relatively poor in comparison to the preceding levels. The material culture coming out of these sites indicated the lifestyle of the people that generally reflected adverse economic conditions. Further light has been shed on this transitional stage by recent excavations at Harappa under Harappa Archaeological Research Project (HARP), to be referred to in the followings.

There has been some dissenting voices also, particularly pertaining the nature of this transition. For example, Gupta argues that the Late Harappan is the result of the breakdown of the urban fabric of the Harappan Civilization and, therefore, represents a stage of readjustment from an urban system to a rural setting “without losing its basic ethos” (14). Chitalwala remarks that the existence of both

cognate and extraneous cultural strains which are easily identifiable and have not metamorphosed into a wholly new cultural entity showing Harappan affinity even in its barest outlines could be regarded as Late Harappan (15). On similar lines, Lal has tried to define the term Late Harappan as a culture which has transformed itself from the Mature Harappan, while losing some of the latter's traits and evolving some new ones, but “still identifiable as having been derived from the latter” (16).



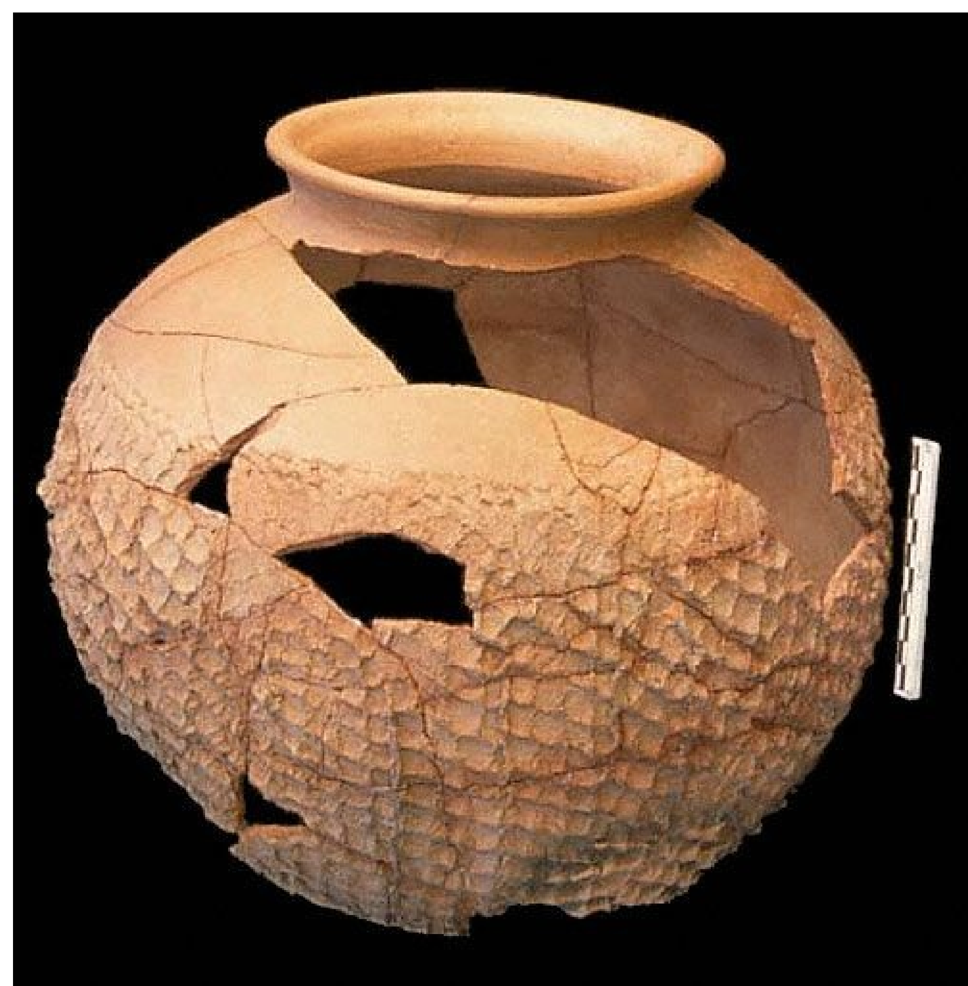
Terracotta bangle fragments decorated with red trefoils outlined in white on a green ground from late Period 3C deposits in Trench 43 at Harappa. This image shows both

sides of the two fragments. The manufacturing of terracotta bangles (and probably some other artifacts) continued, although at a much reduced level.

For the sake of the present discussion, we shall stick to the original concept of Majumdar and Mackay and define the Late Harappan as the “final phase of the Harappan Civilization”, a transitory phase when the Harappan material culture was in the evident decline and was being submerged under the traits of new cultures or the degenerated Harappan ones. As indicated above, this definition is open to criticism; for example, at what level of Harappan material culture would a site be declared a candidate for “Late Harappan”, or, is the Cemetery H culture at Harappa a Late Harappan or postHarappan? Let it be, what it wants to be; let us be content with a running definition that there was an urban culture (the Mature Harappan Civilization) and there was a period of time when the characteristics of this civilization were nowhere to be seen. Let us call it the post-Harappan period. Now, conceptually, there must be a transition between the two. We call this transition the Late Harappan or the final phase of the

Harappan Civilization.

It should be clear from the above that the historical processes impinging on Harappan life in the early second millennium were complex, varied and paced at different times in different regions.



A Cemetery-H urn from Cemetery H at Harappa , 1500 BC - 1200 BC, bearing naturalistic designs but also an interesting series of what seems to be mythological motifs. The latter include peacocks with a human form drawn in

Mythological motifs on Cemetery-H pottery

The Cemetery-H urns bear naturalistic designs (leaves, trees, stars), but also an interesting series of what seem to be mythological motifs. The latter include peacocks with a human form drawn in the middle, and bulls/cows with plant-like attachments to their horns. In one scene, there are two long-horned animals facing each other, held by a man with long wavy hair; a dog seems to be skipping menacingly behind one of the animals.

These scenes have been interpreted in various ways. Some scholars have tried to connect them with the ideas of death and afterlife in the Vedas. However, all these interpretations remain speculative.



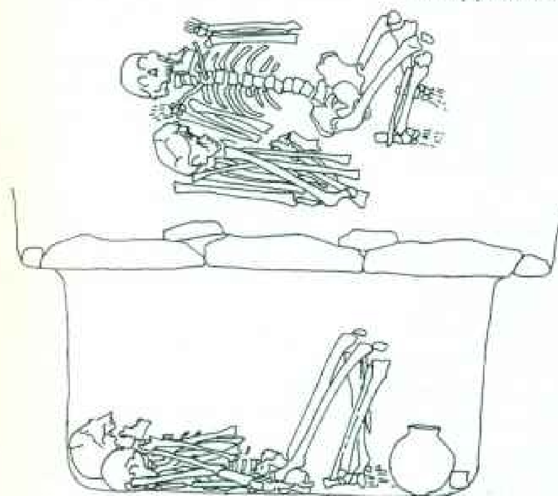


Figure 5.2 Designs on Cemetery-H pots

Katelai yielded two burials of horses along with their masters. The grave goods included lots of plain, buff-red, or grey pottery in a range of shapes such as tall goblets, pedestal cups, beakers with flared mouths, and bottles with long and slender necks. Some graves yielded flat, female figurines with appliqué breasts, occasionally with incised eyes and necklaces. There were copper/bronze objects such as pins with decorated tops, and a bronze model of a horse was found at Katelai. Iron objects were rare.

The Ghaligai cave sequence is an important reference point in this area. In this cave, Phases V, VI, and VII correspond to the early, middle, and late phase of the Gandhara Grave culture. Phase V was associated with a number of graves located on the hill-sides. There were **cist** graves made of vertical and horizontal stone slabs. Post-cremation burials outnumbered inhumations. Remains of rectangular stone houses were identified, and many different types of wheel-made pots and copper and bone artefacts were found. In Phase VI, there were more inhumations than post-cremation burials. Copper artefacts continued, and there was a fine wheel-made pottery in many different shapes, including chalices and cup-on-pedestal. Phase VII represented a late phase of the Gandhara Grave culture and yielded wheel-made red pottery and human terracotta figurines. Iron made its appearance. There is a similarity between some of the pottery types of Periods V–VII and those found in parts of central Asia.

Figure 5.3 Gandhara Grave culture burial, Loebanr



In Kashmir, at sites such as Burzahom and Gufkral, the neolithic phase was followed by a megalithic phase. Megaliths are monuments made of large, roughly dressed slabs of stone. At Burzahom, there are massive **menhirs** (single, tall stones) and a large megalithic stone circle. Grey or black burnished ware made way for a coarse red ware. Bone and stone tools typical of the earlier period continued, but in fewer numbers. There were a few metal objects.

At Gufkral, the megalithic phase (Period II) is marked by fallen menhirs, and was represented by a 50–60 cm thick habitational deposit. There was a nearly 10 cm thick floor, running throughout, with a few breaks marked by pits. Many of the latter were refuse pits, going down to natural soil levels, and contained lots of broken pottery and animal bones. The pottery of Period II showed continuity with neolithic Period I and included a burnished grey ware, gritty red ware, and thick dull-red ware, but the proportion of thick dull-red ware and wheel-made pottery

the middle, and bulls/cows with plant-like attachments to their horns.

Period 4 (Late Harappan) globular pot (H99/8763-503) from Trench 43 at Harappa after reconstruction


A collection of pottery from Late Harappan period at Harappa

What should also be equally clear is that, in their interrelated totality, they had a stunning effect on the Indus peoples. What had once been an ancient urban system, was much altered in terms of the complexity of organization. The major urban centers were no longer functioning as organized cities. If

there was settlement within their bounds it is best

Pointed Base Goblets. These rather carelessly thrown goblets with scoring under the rim, were common in the Late Harappan phase of the Indus Civilization at almost all large settlements, particularly at Harappa

characterized as squatters’ abodes. The large differentiated settlements, such as Harappa and Mohenjo-daro, broke down into 'squats'; where public architecture, workshops and domestic quarters were clearly demarcated; they are no longer found.

Some vestiges of the Harappan society, however, remained in view. While sea trade now hardly existed, the wide distribution of many cultural elements (such as features of ceramic form and decoration, and distinctive stamp seals) indicates that there was still considerable interregional communication, and movements of individuals and groups both within the Indus Valley and between it and the regions to its north and the west continued.There seems to be an increasing amount of contacts between the Indus Valley and the area to its east - a region that was only peripheral to the Indus people so far. Although the manufacture of finely crafted square seals ceased altogether, the fabricating of crudely made round seals continued.

The proposition that a natural dam formed across the area was deserted at that time. Indus River in Sind and flooded out the civilization Scholars have proposed that the process respon
Harappan Civilization - The Material Culture
has been widely critiqued and is not viable. sible for transforming this once grand civilization
So was the case with lapidary and bead making,
It is apparent from the excavations at urban centers of the areas already under cultivation and opened involved changes in the Indus ideology, possibly its
and apparently the faience objects. up new areas for productive agriculture.
as well as from regional surveys that at the opening abandonment. For example, one of the clearer loci of
As the Harappan material culture starts to Apart from a general civilizational decay in
disintegrate, the Indus region seems to break upof the second millennium Indus settlements in Sind
large cities and towns, there is also a widespreadculture change was in the cities, those settlements and
into a series of stylistic zones. That is, during the depopulation and demographic realignment in the
and Baluchistan had been widely abandoned. Table institutions most closely associated with
sociocultural Mature Harappan there is a sense that we are deal‘rural’ area of the Harappan Civilization. It is appar
ing with a single cultural entity when we speak of1 provides a summary by region of the substantive
ent from the excavations as well as from regionalcomplexity. There, craftsmen’s technological virtuos
the Indus Civilization. By the early second millensurveys that at the opening of the second millen
data comparing Indus civilization and the period folity was severely compromised, and the obvious traces
nium, this is no longer the case. The archaeological nium BC Indus settlements in Sind, Punjab, and
record of Indian Punjab, Haryana and eastern Uttar lowing the transformation, generally called the
Indus Baluchistan had been widely abandoned. Only inof the symbolic uses of water disappear. But in some Pradesh forms a rather distinctive stylistic zone
post-urban civilization.

which is quite different and identifiable vis-a-vis the
the Divide this depopulation is not obvious although places the transformation of Indus civilization was
even here the average size of the settlement is
The figures in table 1 would seem to indicate that drastically decreased. Table below provides a not a traumatic event. Scholars speculate on the rea
so-called Cemetery H material from Harappa and
the Cholistan/Bahawalpur area. Sindh is, in turn,
it is still viable to speak of the "eclipse of the Indus summary by region of the substantive data compar sons for this possible abandonment of Indus ideology,
culturally identifiable as a stylistic unit and so is the ing Harappan Civilization and the period following civilization" in Sind and Baluchistan, but in other but no consensus has yet been reached.
differentiated material of this period in Gujarat. An
interesting, and yet to be understood pattern in all
this is that the boundaries which emerge in this pe
the manifest urban culture. The figures in Table would seem to indicate that it is justifiable to speak of the eclipse of the Indus Civilization in the whole

Table 1. Comparison of Harappan and Late-Harappan Settlement (*Possehl*) *Indus Civilization and Indus Post-Urban Civilization*

REGION/Period Site Count Average Site Size (in hectares) Settled Area (in hectares)

SIND
Indus civilization Post-urban
CHOLISTAN
Indus civilization Post-urban
BALUCHISTAN Kulli-Quetta /Indus Post-urban
SAURASHTRA Sorath Indus
Post-urban
EAST
Indus civilization Post-urban
86

6 8.0 688 5.6 34

174 41 5.6 974 5.1 209

129 0 5.8 748 0 0

310 198 5.4 1,674 4.3 815

218 853 13.5 2,943 3.5 2,985

riod are quite similar to those which were apparent in the period just preceding the full flourishing urban life, the so-called Early Harappan cultures.

At much the same time there were significant agricultural developments. Mature Harappan agriculture had been based on the West Asian group of domesticates, which were utilized across the huge area

from the Indus region to Western Europe: wheat, barley, and pulses, sheep, goat, and cattle. By the late third or very early second millennium, new crops were coming under cultivation in the Indus realms: rice and several varieties of millet. These were better suited for cultivation in some parts of Pakistan and India than wheat and barley, and so they both changed the productivity of some of the core area, although in the peripheral regions, notably in the Divide and to a lesser degree in Saurashtra (present-day Gujarat), the history of the culture change was different. In these areas there were strong lines of continuity through the early centuries of the second millennium with little, if any, of the trauma that affected the core area of the civilization.

The 'Late Harappan' sites have a very broad distribution within the geographical area recorded for Harappan Civilization. Yet the data on the Late Harappan is so limited that only the barest essentials of chronological boundaries and material culture traits are known. Cultural changes distinguish the Late from the Mature Harappan Phase, but the



Late Harappan Period dish or lid with perforation at edge for hanging or attaching to large jar. It shows a Blackbuck antelope with trefoil design made of combined circle-and-dot motifs, possibly representing

stars. It is associated with burial pottery of the Cemetery H period, dating after 1900 BC



exact nature of these changes and the processes responsible for them are at present unknown. The disappearance of urban centers noted for the Late Harappan is not an assumption, as some archaeologists would claim, but the cultural changes in smaller settlements are less clear. Nevertheless, a regional survey may be useful:



Burial Urn from Late Harappan Period, from Harappa



Ceramic Serving Stand from Late Harappa Period, Harappa

Painted dish from Harappa with two pea cocks and a sacred tree in the design



Although there were signs of civic decay at Harappa in the Posturban period, it was still a time of innovation and vibrancy, as is demonstrated by the production of glass, a considerable technological advance. This bead is the earliest glass object known from the subcontinent. (Harappa Archaeological Research Project, Courtesy Department of Archaeology and Museums, Government of Pakistan)

otherwise unknown culture took its name. A number of caches of distinctive copper artifacts, including antenna-hilted swords, anthropomorphic axes, swords with a hooked tang and a midrib, and barbed and tanged harpoons, were also found in the doab, and they were attributed to a Copper Hoard culture. It was only in the later twentieth century, however, that excavations demonstrated that eastern OCP and copper hoards were made by the same people in the doab, who could now be chronologically pinned down to the early to mid second millennium. The copper hoards' artifacts are often of high-arsenic copper, the arsenic either being a deliberate alloy or, more probably, present as an impurity in the copper ore: This contrasts with other contemporary and earlier copper artifacts in South Asia, indicating a source other than the Aravallis.

OCP is a red ware with red slip and often painted decoration. Its antecedents lay in the red wares of the Jodhpura-Ganeshwar culture, showing that its makers included the indigenous cultures of the region, which had a long tradition of manufacturing copper artifacts. OCP sites can be divided into two groups. The western OCP was known at sites such as Jodhpura, Siswal, Mitathal, and Bara, occupied by late Jodhpura-Ganeshwar or Late Harappan



A glass-like bead from the Late period of Harappa

Although there were signs of civic decay at Harappa in the Posturban period, it was still a time of innovation and vibrancy, as is demonstrated by the production
glass object known from the
Department of Archaeology
of glass, a considerable technological advance. This bead is the earliest
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and Museums, Archaeological Research Government of Pakistan)

A collection of reconstructed pottery from the Late levels of Trench 43 (Harappa). These shapes include the final Harappan forms and transitional Late Harappan period shapes

otherwise unknown culture took its name. A number of caches of distinctive copper artifacts, including antenna-hilted swords, anthropomorphic axes, swords with a hooked tang and a midrib, and barbed and tanged harpoons, were also found in the doab, and they were attributed to a Copper Hoard culture. It was only in the later twentieth century, however, that excavations demonstrated that eastern OCP and copper hoards were made by the same people in the doab, who could now be chronologically pinned down to the early to mid second millennium. The copper hoards' artifacts are often of higharsenic copper, the arsenic either being a deliberate alloy or, more probably,

Mohenjo-daro and Southern Sindh: As stated earlier, at Mohenjo-daro, the last period of occupation of the city shows a serious decline in civic standards, with poorly constructed houses, pottery kilns in what had previously been residential areas, the neglect of civic amenities such as drains, and corpses thrown into abandoned houses or streets instead of being buried with due rites. Important public buildings such as the Great Bath went out of use. Some stone sculptures were deliberately smashed. Marshall and Mackay found that Late Harappan period houses showed marked differences from the earlier ones. Those built now had entrances differently placed, with old doorways blocked. Houses in DK-G had been partitioned, as if families were splitting; this meant, for example, that a well in a large residential structure was now directly accessible to only one of the family subdivisions. An entrance could be narrowed down from a width of 1.2 m to less than 60 cm or 2 ft. Clear signs of decay are apparent in the fact that walls are now thin, perhaps no longer bearing the weight of upper storys, with odd-sized bricks laid in the most haphazard of ways. The huge residential building or 'Palace' of DK-G area was, in the Late Harappan phase, not only subdivided but this locality was transformed into an artisans' quarter. Meanwhile, on the citadel, the Pillared Hall, a beautifully paved structure for which five courses of baked brick, most accurately cut and set, had been used, was in the Late period partitioned by rough brick walls and utilized at least in part for *shankh* shell cutting work. We have therefore been alerted to the possibility that city life at Mohenjo-daro was not as good in the Late period as it had been earlier, at least not in the public realm (2).

An intriguing indicator of social change in the Late Harappan period at Mohenjo-daro is the

appearance of the pointed goblet (see the figure below). These were carelessly turned on the wheel, their height varying 7 to 10 cm with a pointed base. They were not meant to be stood upright on floors or shelves when full. The deep scoring around the shoulder shows that such pots were to be tied with string in order to be carried around. AIthough present in large numbers at cities like Harappa and Mohenjo-daro, and known at Amri, they are practically absent in the peripheral towns like Lothal and Shortughai (2).

At Chanhu-daro one does not see the enormously high walls because people did not raise new sections over standing ones in a continuous process as at Mohenjo-daro. This is probably significant. There are three Mature Harappan building levels and level II and I structures show completely different wall alignments and orientations to those beneath them. There were junctures when parts, at least, of the town were left unoccupied. For example, between II and **III** there is a 4-foot layer of rubbish, dust, rubble and potsherds. How long such abandonments lasted we cannot tell, but they were long enough for structures to decay. These abandonments of Chanhu-daro require further thought than has been given to the history of the town, even if they were for short spells. Together with this comes evidence of metal hoards and numerous unfinished manufactures such as saddle querns, mace-heads, and shell artifacts (2).

In southern Sindh, Amri lies in the zone where the hills of Sindh Kohistan abut on to the west bank of the Indus, and Chanhu-daro 15 km east. In 1979 Casal elaborated on the sequence at this site with an interesting perspective on the history of the two neighboring settlements of southern Sindh (17). At Amri there were five strata with Harappan material, with a few changes in pottery from one to the next. In the uppermost (level **III** C) of these strata occurred the pointed-base scored goblet together with Jhukar sherds, probably brought by intruders, Casal said (17). But this stratum, **III** C, was the only Mature Harappan level with baked brick construction in the Harappan mode, with cubical weights, writing, and an uninscribed seal (17). It has ceramic parallels with Late Mohenjo-daro. Casal therefore believed that Amri

A late Harappan house in Gujarat with reused pillar members, (c. 1900-1500 BC)

was a poor and insignificant settlement to which people of the richer Chanhu-daro had fled; that there had been quick abandonment of Chanhu-daro due to raids, but that hill raiders squatted at Chanhu-daro before moving on to Amri where they mixed with the local people and then went on to Mohenjo-daro and Jhukar (17). Casal associated Jhukar pottery with raiders from Baluchistan because, according to him, this ceramic also occurs at sites like Periano Ghundai; but there is also a similarity between Jhukar pottery and that of preHarappan Amri even though Casal saw it as a mixture of Indus and Baluchi elements.

This is an attractive hypothesis although it remains for us to confirm the relative chronology of the two settlements, and although Amri would be a more logical first halt than Chanhu-daro for raiders from the Kohistan. At Amri, too, we have seen that the 'hill raiders' apparently did not construct many durable structures.

Baluchistan and Helmand Region: In Baluchistan the evidence is extremely fragmentary. In the northern part, Stuart Piggott has drawn attention to the thick layers of burning indicating violent destruction of whole settlements at Rana Ghundai, Dabarkot, etc. The southern part the cemetery at Shahitump, dug into an abandoned Kulli settlement, shows copper stamp-seals, a copper shaft-hole axe and painted grey pottery, including footed goblets and bowls.

At Nausharo, the final phase of period II contains distinctive pottery similar in that of the cemeteries of southern Central Asia. A cemetery south of Mehrgarh and another at Sibri contain equally distinctive pottery and bronze objects inplaced by an increased quantity of traditional local wares, such as Prabhas ware, and by new wares, in particular Lustrous Red ware, a bright red ceramic that became dominant in Gujarat sites like Rangpur during the early second millennium and that was later also used farther afield in the Deccan, reflecting trade, population movement, or both.

Other typical Mature Harappan material such as stone weights, inscribed seals, and even beads, disappeared. In contrast, copper continued in use, perhaps reflecting the development of close trading relations with the Chalcolithic cultures to the east of Gujarat, Ahar-Banas, Jodhpur-Ganeshwar, and Malwa. Significantly, a number of the copper objects are of types known not in the Indus Civilization but in the Chalcolthic cultures of Rajasthan and the Deccan.

cluding a shaft-hole axe-adze. These sites also show remarkable affinities to the cemeteries of North Afghani stan and Central Asia.

TheLateHarappanperiod
saw the abandonment of Harappan settlements in the Makran, such as Sutkagen-dor, due to falling sealevels, which also affected some sites in Gu jarat, including Lothal. Patterns of sea trade through the Gulf altered as Mesopotamia experienced political and economic upheavals from around 2000 BC and the Indus Valley saw a precipitates decline in trade economy in its own realm. The Makrani ports no longer acted as the entry point for sea trade on behalf of the Indus re gion.



AtMundigak(southernAf
ghanistan) a considerable reconstruc tion of a massive brick structure is found over the ruins of the palace of an earlier period. Copper stamp seals make their

Period 4 (Late Harappan transitional) kiln with hollow lower fire box and arched floor with holes for allowing heat to enter the upper firing chamber. This type of kiln was introduced at Harappa ca. 1900 BC and allowed the potters to reach higher temperatures more efficiently

first appearance during period IV and

continue into V. The evidence in this
region seems to suggest that there was a substantial change in the settlements, in the style of pottery and in its manufacturing techniques.

Kutch and Saurashtra: In Gujarat the transition to Late Harappan began early, perhaps by 2100BC. This region had always maintained a degree of local distinctiveness: for example, pottery styles characteristic of the Early and pre-Harappan periods, such as Prabhas ware, continued in use alongside Mature Harappan pottery. Sites like Lothal had been fully integrated members of the Indus ecumene; others, such as Somnath, less so. By the end of the third millennium, however, even previously well integrated sites such as Lothal were beginning to drop out of the Mature Harappan way of life. Instead of high-quality flint brought in from the Rohri Hills in Sindh, stone tools were now made of local stone such as jasper and agate. Mature Harappan pottery declined in quantity and was re

The regional city of Dholavira declined and was then abandoned. It was re-occupied after perhaps fifty years as a small settlement of poor-quality houses that lasted for about a century before again being deserted. At many sites, such as Rangpur, brick architecture was abandoned in favor of other styles of construction: wattle and daub with a wooden framework, or stone foundations on which walls were built of mud, and in most cases thatched roofs. The construction of bathrooms and drains ceased. The warehouses at Lothal went out of use. This certainly reflected a civilizational decline and not “a change of emphasis”; the urban aspects of the Indus Civilization were replaced by a much less complicated existence.

While some settlements were abandoned, some settlements experienced an expansion. The earlier half of the second millennium also saw a considerable increase in the number of new settlements. This probably reflects the change to new crops: Mature Harappan agriculture had used wheat and barley as the staple crops and in Gujarat native millets had also been important; now bajra and jowar, drought-resistant millets that were high yielding, free threshing, and well suited to the environment of Saurashra, became increasingly important. Rice may also have been cultivated at some sites, such as Rangpur, but there is no solid evidence for this assumption.

Apart from Lothal, there are Rangpur, Somnath and Rojdi where the subsequent development can be found. These three sites give a complete sequence from the Mature Harappan period down to the arrival of iron. The distinctive Harappan form of pottery now disappears and new painted motifs are found. Lustrous Red ware makes its appearance and in the final phase lustrous red ware becomes a common pottery.

The evidence at Surkotada in eastern Kutch is not as extensive, but is telling in its own way. There appear to have been disastrous events in the late period of Harappan occupation. Between IB and IC levels, IC being the last, there is a thick though uneven layer of ash, the sign of 'a huge conflagration' (18), in all parts of the site. Perhaps this was not a natural fire, for during the next period, IC, the citadel defenses were made truly secure. The gateway complex was rebuilt as a strongly guarded and restricted entrance system. Incidentally, IC was a shallow stratum less than a meter in depth whereas IA was in places 4.4 m thick. There are about half a dozen minor jewelry caches in IC, four of them in buried pots. Some new kinds of painted pottery appears (2).

Punjab and Cholistan: A study of the settlement pattern of the Harappan and Late Harappan sites in the Punjab and the Bahawalpur area also indicates a trend of decay. Along the banks of the Hakra river

the number of settlements came down to 50 in the Late Harappan period from 174 in the Mature Harappan period. The population seems to have either perished or moved away to other areas. Whereas the number of sites in the triangle of Harappa, Bahawalpur and Mohenjodaro declined, the number of settlements in the outlying areas of East Punjab, and Haryana increased. This indicates a phenomenal increase in the number of settlements in these areas, although their average size was quite small. The population size may have not seen a, equally phenomenal growth but at least it remained stable or increased some. This increase in the population of this region is often explained by the emigration of people from the core regions of Harappan Civilization, especially from Cholistan.

The evidence from Harappa presents a scenario which is similar to Mohenjo-daro. Here too the uppermost strata on mounds AB and F have scanty building remains, and those still extant were constructed of brickbats. Later excavations (3,19) distinguish a Late period (no. 3) within which the lowest stratum (no. 3A) shows unprepared walls, non-functioning drains, and animal skeletons in the streets. This was, however, followed by a phase of rebuilding and repair. In the uppermost (no. *3C)* level, scored goblets are abundantly found; there are encroachments onto the streets, and extensive brick robbing. Period 4 on mounds E and AB is identified by Meadow and Kenoyer as transitional between the Harappan and the Cemetery H culture of period 5 when people using a totally different kind of pottery buried their dead in the old cemetery of Harappa. The architectural remains of levels 4 and 5 are scant and those that occur are structures utilizing assorted sizes of bricks (3,20).

Vats discovered a decadent period of structures of re-used brick and pottery including some similar to that discovered in Cemetery H. which bore a stratigraphic relationship to an earlier cemetery known as R 37 of the Mature Harappan period. All the cemeteries belonging to post-urban phase have been identified as Cemetery H culture. Some pottery of this phase in similar to that of mature phase whereas in other cases the pottery introduces both new form and new painted styles. The pottery of Cemetery H and the religious content of its decorations suggest on the one hand a continuum with Mature Harappan elements, and on the other the presence of new features which have been associated with the arrival of some new people. This period has been placed between 2000 and 1500 BC.

A small area of Late Harappa Phase occupation from Periods 4 and 5 was excavated on Mound AB in 1996. These excavations along with work conducted in 1998 through 2000 on Mound F have provided new insights into the important continuities and changes that took place during the Late Harappan period. Although there may have been a major shift in burial practices during this transition and some dramatic changes in artifact styles and production, other aspects of architecture and many crafts show considerable continuities. The distribution of Cemetery H pottery on all of the major mounds at Harappa, and widespread encroachment of settlement onto the streets and into public spaces indicates that the site was not being abandoned. On the contrary, all of the evidence indicates that certain neighborhoods were becoming overcrowded and the Harappan Civilization was coming to an end.

Harappa is perhaps the only urban center where it has been possible to trace the transition from the Harappan to the post-Harappan (Cemetery H) period. Most of our information on this period comes from early excavations in Cemetery H and from disturbed occupation deposits containing fragmentary walls, drains, and pottery (3). A transitional phase between the Harappan and the Late Harappan was called Period 4 and the fully developed Late Harappan characterized by the pottery from the upper level burials in Cemetery H was called Period 5.

Before its abandonment Harappa seems to have witnessed the arrival of a group of people about whom we know through their burial practices. They were using a pottery which was different from those of the Harappans. Their culture is known as the 'Cemetery H' culture. We find that buildings associated with power and ideology were decaying and goods related to displays of prestige and splendor were becoming increasingly scarce. Later on, city of Harappa, like Mohenjodaro, was abondoned altogether.

To understand the situation in Punjab, one has to refer back to the advancements taking place in Harappan studies in the core region of the Harappan Culture. The analysis of data from Mohenjo-daro, Jhukar, Arnri and Chanhu-daro shows that the Harappan Civilization in the Sindh region transformed into what is known as the Jhukar Culture. Similarly, the excavations at Harappa

!Late Harappan " " " " Post-Harappan" " " " Painted Grey Ware" " " " Early Historic Period" "

!

ca. 1900 - 1700 BC ca. 1700 - 1200 BC ca. 1200 - 800 BC

ca. 600 BC Onward

Post-Urban Phase: Equally instructive for the understanding of the Indus Civilization, although not directly related to the Harappan Civilization, is the post-Harappan period, that is, the time period from the decline of the Harappan urbanism to the growth of second urbanism. It is the most poorly understood period of Pakistan's early cultural history. Possehl calls this period 'Post-urban' and has proposed to divide it into three sub-divisions, Early, Middle and Late. The Early Post-urban period, dated from *ca.* 2000-1700 BC, is equivalent to the Later Harappan period described above, covering a time when the Harappan Civilizations was either still flourishing in some parts, or at any rate was still very much present in people's memories. The Middle period, dated from *ca*. 1700-1300 BC, represents a time of greater regionalization of cultures

The post-Urban Period

by Dales, Meadow and Kenoyer suggest that the Period IV shows elements of transition towards the so-called Cemetery H culture, which is fully manifested in Period V. From the distribution of sites it appears that the Jhukar Culture sites are found more in the lower Indus region while most of the Cemetery H related sites are concentrated in the Sutlej-Beas Basin. In case of Cemetery H, the repertoire of designs and the animal and floral motifs are usually encountered with the Harappan ceramic assemblage, and hence, the Cemetery H people culturally do not seem to have been different from the Harappans except that few vestiges of urbanization there remain.

The scene in Indian Punjab is slightly different from that of Pakistani Punjab. Though a large number of sites have been excavated in Indian Punjab, the pattern of movement of the Harappans in this part remains far from clear. The Harappans reached here through the Sutlej river and the SutlejGhaggar Doab has a concentration of such sites. Excavations at Kotla Nihang Khan, Ropar (now Rupnagar), Bara, Dher Majra, Chandigarh, Sanghol, Nagar, Dadheri and Katpalon give a general background of the Harappan movement in Indian Punjab (39). In the words of B.B. Lal (40): “the overall picture in the upper Sutlej valley highlights a local pottery tradition termed the Baran. It is in this milieu that the Mature Harappan made its appearance. However, in due course of time the Harappan elements became

feeble but the thrust of the Barans continued”.
and the growing emergence of a distinctly postHarappan style. Finally, the Late Post-urban period dated from *ca ca* 1000 BC, witnessed an increasing pace of development towards new cultural groupings. Another way to describe the postUrban period is as depicted in the following table.

The very term 'Post-Urban' phase indicates that it marks the termination of an Urban phase and implying the collapse of a flourishing civilization. It also suggests that the preceding Urban phase was more in line with the concept of civilization while the Post-Urban phase was a poor reminder of this glorious past. This is obviously an outcome of the normal process of cultural degradation due to a general economic decline that brought in changes in the internal interaction of the society.

Post-Harappan period witnessed a further decline in the civic standards, a process that had already started in the Late-Harappan phase. In fact, this cultural period represents the reversal of all the abstract criteria of urbanization as laid down by Childe (21) and discussed by Adams (22). Ghosh has identified this period with those which are later than the Mature Harappan but still have some affinities with it in a degenerated form. Dales observed that with the decline of the Harappan Civilization, the sophisticated Harappan traits were watered down to a large extent by mingling with the impoverished local cultures, until what was once distinctively Harappan was diluted to the point of nonexistence (23).

As though the difficulty in defining the postHarappan period was not enough, there are some scholars who effectively deny the existence of such a period altogether. For instance, Possehl, in the context of Gujarat, believes that the level of sociocultural attainments which existed throughout its Mature phase was “slowed down” in its later stage, it was centrally less organized, less differentiated and less specialized than the Urban phase but it was still a continuum of the preceding cultural flow. He doubts that stratigraphic dead ends (the termination of a certain kind of material culture in the vertical sequence of a site) mean the end of a tradition: quoting him again, “a state it was that died”, he argued in 1979, “not the Harappan Civilization or its pottery and other material constituents”. Similarly, Shaffer considered it a process of decentralization and localization which gave rise to regional cultural expressions rather than extinction (26). Allchins go even further; according to them, “what is probably important in understanding the cultural development of the post-Urban phase is that throughout every province of the Indus Civilization societies survived which, while losing the distinctive characteristics of the Indus Civilization, nonetheless retained a broadly 'Harappan' tradition in other respects” (25). These opinions, in effect, downplay the disintegration and the eventual end of the Harappan Civilization and, instead, stress the continuity of the Indus culture into the early historic times. This line of thought is very much favored by some ‘nationalist” Indian archaeologists because it naturally connects the “Indian civilization” to the antiquity of the Indus Civilization.

Here we follow the majority opinion, that is, the Indus Age eventually came to an end and that it was followed by a cultural period which is definable on its own, with only a tangential relation with the urban culture that we identify with the Harappan Civilization. This post-Harappan period does not represent a unified or culturally integrated culture; instead, it represents a collection of diverse cultures with some ill-defined geographical boundaries but more-or-less confined within the same geographical areas where the pre-Urban cultures of the Early Harappan genre thrived prior to the mid third millennium BC. Our information about these postHarappan cultures is limited but we shall nevertheless attempt an outline in the followings.

Before we begin, however, it is pertinent to note the various aspects of the Harappan culture through which we define these post-Harappan cultures. These broad parameters include large size settlements, public architecture, long distance trade, craft specialization, class hierarchy, state organization as well as diagnostic artifacts such as Indus seals, ceramic forms like goblets, perforated cylindrical jars and jars with 'S' profiles often decorated with intricate or naturalistic painted motifs. In addition, triangular terracotta cakes, kidney shaped inlays, long chert blades of Rohri origin, etc., also suggested by Childe (21) and Wheeler (27), are characteristic features of the Harappan settlements associated with the Urban phase. However, with renewed research on the above mentioned aspects of Urban Harappan phase, it is clear that the presence or absence of these features would depend on multiple factors like location and nature of the settlements.

The most striking aspect of the end of the Harappan Civilization is the desertion of the largest Harappan urban centers, and a majority of the smaller settlements. At the five largest settlements, Mohenjo-daro, Harappa, Ganweriwala, Dholavira, and Rakhi Garhi, there are no vestiges of postHarappan occupation (except for Cemetery H at Harappa, to be discussed below). Of 132 Harappan settlements, on which information is available, 101 were deserted (2). Village or town abandonment is not in itself particularly mysterious.It has occurred often in history, because of repeated droughts in a region, or village epidemics, destruction of houses by flood, the wearing out of soil fertility, or the promise of better land elsewhere. In our case it is the scale of desertion and its permanence (not desertions for a few years until recovery) that are significant. We do not, however, know over what length of time the various Harappan cities and villages were abandoned.

In Sindh, the indications are that some sites were abandoned around 2000 BC or in the following centuries and that the core of the Indus civilization began to disintegrate and come to an end shortly after. Not all sites suffered the same fate: Mohenjodaro petered out, while at nearby Jhukar and Lohamjo-daro, Chanhu-daro and Amri continued and built upon the remains of the Harappan. In the north, while a large number of villages were abandoned, the grand city of Harappa continued to exist, adopting a new culture and existing as a merely small village. A new Chalcolithic culture appears in Swat to the west of the Indus and several regional non-urban cultures sprung up in the east of Punjab. These cultural changes were not confined to the Indus Valley alone; similar changes happened on the borderlands to the west - in central Asia and Iran. An echo of these changes came from as far as Mesopotamia. As a result, several types of cultural assemblages occur at the sites that are later than the Urban Harappan and to a large extent, culturally do not wholly conform to the former. These PostUrban Harappan settlements exist in various regions and reflect different stages of development (15,26); some are the extensions of the Harappan occupation and others are new settlements.

The Harappan Civilizationn was succeeded by several regional cultures, we call 'chalcolithic': small-scale, usually with small, one- or two-room cottages, very few crafts, a simple stone tool technology supplemented by a few forms of bone tools, and not many types of copper/bronze artifacts, often ornaments rather than tools. There were no great storage structures, or distinctive sculptural styles, no fortifications in the true sense, not even communal wells. There is no evidence of cosmopolitan interaction with other societies. With these clues in mind we can now discuss the various post-Urban cultures in the Greater Indus Valley and the peripheral areas around it. The description is restricted to those cultures that were located in the Harappan culture area and its margins. Some repetition of

material presented earlier is inevitable, because the aim of this section is to provide an outline of the

post-Bronze Age cultural situation.

LowerIndus: Like the Greater Indus Valley in general, in the early second millennium, a number of settlements in Sindh were abandoned, including Balakot, Allahdino, and Mohenjo-daro. The latest surviving levels at Mohenjo-daro saw squatter occupations in some dilapidated houses. Among the objects found there are a few stray artifacts that seem alien in style: a copper shaft hole axe-adze of Iranian or Central Asian design and several daggers with midribs and holes where they had been riveted to metal handles. Similar objects are known at Chanhu-daro, Amri, and Jhukar, including shaft hole axes, copper pins with decorated heads, and round or occasionally square compartmented stamp seals bearing geometric designs, including one resembling a radiating sun or Catherine wheel. These indicate that there were significant contacts between Sindh and the cultures west of the mountains in Iran and Turkmenia, whether through trade or the arrival of immigrants.

These objects were associated with a style of pottery named after the site of Jhukar, a buffware with painted designs, with similarities to the Early Indus Amri ware. This pottery can be seen to have developed from that of the Harappan period, as can many of the artifacts at these and other contempo rary sites in Sindh, though there seems to have



been a steady decline in their quality. Though there was no sudden break between the Mature Harap pan and Jhukar occupations in these settlements, there was a marked decline in the standard of living, with inferior houses built from salvaged bricks and no attempt to follow the earlier planned street lay outs. Hoards of concealed jewelry and metal ob jects have been found at Mohenjo-daro and Chanhu-daro, suggesting a prevalent feeling of in security. In the latter town, unfinished craft objects suggest the hasty abandonment of activities in the

A Copper/bronze shaft-hole axe-adze from Sibri, near
Fig. 8.1. A. Copper/bronze cosmetic bottle and its pin from Cenotaph 2; B. Stone button-seal from Cenotaph
Mehrgarh
pin from Cenotaph 1; D. Copper/bronze vessels from Grave 1; E. Copper/bronze shafthole axe-adze from Sibri

face of danger. There are, however, no signs of the violent destruction that have been found in many sites farther west, in Baluchistan and eastern Iran.

A fairly large number of settlements in the Lower Indus Valley came under the cultural influ ence of Jhukar in the period 1800-700 BC. Jhukar lies about 10 km west of Larkana town and is the type-site of the Jhukar culture of post-urban Sindh. Jhukar material (pottery in the main) is also found at Mohenjo-daro, Amri, and Lohumjo-daro (a site

south of Mohenjo-daro), and other artifactual mate rial of this category is attested at Chanhu-daro. Jhukar culture is mainly recognized by its assem blage of pottery, which is bichrome: on a cream background (pots were given a thick slip of this color) painted designs were produced in red and black. There is none of the tidiness of Harappan pot painting, nor the artistic value of the Cemetery H painting of the upper Indus region. The clay used for the pottery is not particularly fine, and baking in bonfires occasionally left its mark on the surface of

Mughal (digging at Jhukar) and Dales (who re-excavated Mohenjo-daro) are of the opinion that the Jhukar is only a late developed ceramic tradition and not the sign of a new culture in Sindh, leave alone the remains of intrusive Aryans (29, 31, 32). Mughal argued that at the site of Jhukar, Mature Harappan pottery was present in all three phases and was associated with Jhukar pottery, which means that it was only an evolving ceramic tradition. Possehl, too, stressed the absence of stratigraphic breaks between the Harappan and Jhukar pottery strata at the sites in Sindh.

The important point about Dales and Mughal's observations is chronology: one kind of material culture does not follow on the other, but overlaps with it. One wonders if other explanations cannot be offered for the co-existence of Harappan and Jhukar pottery. In certain strata at some sites, Amrian or Kot Dijian pottery likewise occurs together with Harappan pottery and no one has denied the distinctness of any of these as cultural a pot. There are cups and a rather unusual straightsided shallow dish and, a carinated bowl, both on stands. The shapes and motifs on the Jhukar pottery differ from the Harappan styles and there are some innovative technical changes in the use of new pigments to produce different color effects on the pottery designs.

However, there is enough continuity that the new Jhukar style does not appear to signal a break in the sequence, as Ernest Mackay had thought when he discovered Jhukar pots in the 1930s at Chanhu-daro. Such a continuity of cultural traits has also been documented by Rafique Mughal (29) and Dales (31) at the site of Jhukar and at Mohenjodaro; and most recently by Heidi Miller (30) at Chanhu-daro. There are changes, however. At Chanhu-daro, Miller describes the settlement as "haphazard and less focused" during this transitional phase that marks the end of occupation of many sites in the Lower Indus. The square stamp seals are replaced with circular ones bearing new motifs and the terracotta female figurines associated with Indus ideologies and cubical stone weights, both signature artifacts of the civilization, are rare. The Indus script also disappears, save for examples incised on pottery (29). Jhukar and the associated sites were merely a shadow of the Late Harappan culture in the Lower Indus.
phenomena; moreover, such overlaps could indicate that the Harappan material culture was intrusive in these places.

At Jhukar there is a clear cultural overlap and commingling of cultures; and in the artifacts new tastes, but perhaps the old artisans, seem evident. At Jhukar now the goblet is painted with Jhukar motifs. So if one is looking for elements in the archaeological record of new people, the Jhukar and Cemetery-H cultures with their larger distribution appear to be claimants to that title.

A Central Asian type Copper/bronze cosmetic bottle and its pin from Mehrgarh Cemetery (late period)

Post-urban there, seems to record significant change. The drop from 86 to 6 sites is important, but so too, is the abandonment, or virtual aban donment of Mohenjodaro, the premier urban centre.

The excavators of Chanhu-daro and Amri believed the Jhukar to be an intrusive and post Harappan element, The evidence at Chanhu-daro of other artifacts like bone awls, fire-places, head**Sibri and the South Cemet**rests and seals, and a totally different style of habi

tation have perhaps not been sufficiently appreci ated by Dales, Mughal, and Possehl. As Ratngar points out (2), the fact that Mackay found it difficult to isolate Jhukar material from Harappan was be cause standing Harappan structures were occupied, disturbed, and modified - not because one culture grew, little by little, out of the other.

Another reservation one can voice about the idea of Jhukar being little more than a new ceramic style is that in Mackay's report on Chanhu-daro 'Jhukar' means not only a certain kind of pottery but also (i) huts constructed of brickbats and matting; (ii) fireplaces outside huts or indoors in wall re cesses formerly occupied by doorways; (iii) a profu sion of bone awls used for making mats; (iv) round or occasionally rectangular seals with basic geo metric motifs (except for a few showing animals or a beautifully executed knot design); (v) short barrel shaped or biconical beads of faience; and (vi) bronze tools and pins with spiral or other sorts of ornamental heads. Further study will probably re veal more such items and that 'Jhukar' was indeed what we can call an archaeological culture, not a diluted form of the Harappan.

Another area of our immediate interest in context of the post-Harappan landscape in Sindh is the Kachi plain. The Kachi is an extremely arid and inhospitable area immediately west of the lower Indus alluvial plain and lies at the terminus of a world route across southern Afghanistan and north ern Baluchistan. On this tract, that was watered by the Bolan and other mountain streams, the mound



of Nausharo has pre-Harappan as well as Harappan levels (I to III). Level IV, in parts eroded or disturbed by graves of recent times, has pottery in the Harappan tradition as well as Kulli-like round jars and painted goat friezes around pots. There are also Kulli-style clay figurines. In addition, there are 'trumpet-shaped' vessels with grooved rims and other elements reminiscent of those at Sibri (a site also located in the Kachi) and sites on the Bolan route.

Notwithstandingthecontinuityshownby Mughal and Dales, the Jhukar culture contains a number of intrusive objects, such as round button seals, which find their closest analogues to the finds from the Bactria-Margiana Archaeological Complex. Similarly, evidence from Nausharo IV, Mehrgarh VII, Sibri and Priak indicates new influences showing too many intrusive elements and similarities with the Bactria-Margiana Archaeological Complex to be seen as a purely local assemblage. With these new influences, there appears to be a gradual change with a steady reduction in the characteristic Harappan elements and their replacement by a new Jhukar style reflecting a distinct shift of craft techniques. There was a withdrawal of certain distinctive elements of life, such as the Harappan seals and the use of writing. The same may be implied by the sudden appearance of circular or square stamp seals of stone or faience. The documentation of settlement in Sindh during the Jhukar period, the

The excavators found that in pre-Harappan times Nausharo had links with the Baluchistan uplands, but these did not last into the Harappan period. The lapis lazuli that we would have expected to come from Chagai, is now scarce. At Nausharo scored goblets and other ceramic elements of the tail end of the Harappan period are absent and the material culture shows, in level IV, fewer links with Sindh than with eastern Iran and Turkmenistan. Burials near the earlier settlement of Mehrgarh (Mehrgarh South Cemetery) fitted this pattern, containing plain gray pottery and metal objects paralleled in north Afghanistan or southern Turkmenia. Material from a small settlement at nearby Sibri was similar, including BMAC-style compartmented seals and flat violin-shaped figurines.

Sibri is a small, one-hectare site with a shallow deposit, comprising two architectural levels. The pottery produced here was coarse, and hand-made though there was some wheel-tempered ware as well, each in a range of shapes. Many flaked stone as well as bone tools, several stones for grinding, and several terracotta figurines, including flat, violinshaped female figurines of the sort seen also at Hissar, Altyn, and some BMAC sites of northern Afghanistan have been found here. Other parallels with the world to the west were a small stone column from the surface, bronze and stone compartmented seals, a bronze shaft-hole axe-adze, and pins. Most important, however, is the fact reported by Santoni (33), that the quality and number of bronze artifacts reported at Sibri and at the Mehrgarh South Cemetery is higher than that found at earlier sites.

The best-known site of this period, however, is Pirak. Here a large settlement was established around 1700 BC. Pirak, about 20 km east of Nausharo and 11 km south of the modern town of Sibi, was a substantial village (9 hectares). It was occupied until about 700 BC, with breaks in habitation between about 1400-1300 BC and 1100 BC. The houses were very different from those of the Indus Valley; they were rectangular, often multiroomed, structures of mud brick, and lines of niches were set into the inside of the walls. A brick platform held the hearth, and reed matting covered the floor. Silos were used to store the grain grown there, which comprised wheat, barley, jowar, and rice. Material from the settlement included handmade pottery decorated with painted bands of geometric patterns, compartmented seals like those from the BMAC, many copper or bronze objects, and terracotta

figurines depicting camels and horses. In the succeeding period, the figurines also show horses with human riders. Many bones of both horses and camels have also been recovered from the settlement. Domestic Bactrian camels were kept in earlier times in Turkmenia and at Shahr-i Sokhta. Horses had been domesticated in the Eurasian steppe around 4000 BC but did not reach the Indo-Iranian region until the second millennium; the Pirak specimens are the earliest securely dated and indubitable evidence of these domestic animals in the subcontinent. Despite the new features at Pirak, however, there was also material showing continuity with local traditions.

In spite of the openness of Sibri and Pirak, for example, to influence or migration from Central Asia, the site of Pirak has, in its entire sequence, produced no more than half a dozen beads of lapis lazuli. There is no turquoise either, though one pendant with turquoise and lapis is reported from a Mehrgarh cenotaph. It is only from about 1100 BC onwards that Durkhan, a site near Dadhar, 20 km west of Pirak, has a lapis lazuli industry that testifies to the resumption of the movement of this stone down the Bolan Pass. So, also, is the case with copper and bronze. Few of our chalcolithic cultures have produced metal in substantial quantity. This, we know, could well be contingent on ancient discard patterns and on the survival of the metal in the soil of mounds. The telling factor, however, is that very few tool types in metal have been found.

As for the economy, it was based on crops that included not only wheat and barley but also jowar and rice. The excavators point out that rice needs to be cooked in water (unlike wheat and barley, whose flour can be cooked as flat bread) and that there are round bottomed pots (stained with soot at the base) with handles for easy han

Cemetery H cultural area in the upper Indus

dling on the fire, at Pirak. As for jowar, it was to become the mainstay of agriculture in the hot Kachi plain with its extremely low rainfall. This crop, sorghum or the great millet, could have come to the Kachi from north-eastern Africa via Yemen and perhaps the Oman peninsula, although its identification in the latter region is now contested. With inputs from the South Asian monsoon heartland, Central Asia, and also the Gulf, the culture of Pirak exhibits a frontier character true to its position on the Bolan Pass route

Baluchistan, Helmand, and Makran: Baluchistan seems to have experienced considerable disruption in the early to middle second millennium. A number of settlements were destroyed by fire, including Rana Ghundai and Dabarkot, the latter apparently on four occasions. Gumla was destroyed and abandoned, and later burials were dug into its ruins. Much of the material of this period recovered from the region is in the form of stray objects or burials with material that is linked stylistically with the BMAC and regions to its north.

Further west, in Nal, a cemetery was dug into the remains of a pre-Harappan village. Even further west, in Makran, there were cemeteries at Mehi, Shahi Tump, and Khurab, dug into deserted Kulli settlements. The graves in these cemeteries (ordinary inhumations) were rich in sea shell, lapis lazuli, and agate-onyx ornaments. There were compartmented seals and at Shahi Tump a shaft-hole bronze axe was an important find. It is a tool type far in advance of the bronze axes in frequent use at Harappan sites, which were flat and rectangular and could not have been fitted to their handles as securely as the shaft-holed ones. The pottery was hitherto unknown to this area, and Piggott (34) sees these cemeteries as the vestiges of a migration of warrior groups, probably coming from the northwest.

A few other points may be noted. First, after the Mature Harappan period Sutkagen-dor, Sotkakoh, and Miri Qalat (the first two of these sites were on the third-millennium shore line, the third located inland) saw no second-millennium occupation. Second, the excavators of Miri Qalat have questioned Stein and Piggott's dating of the Shahi Tump cemetery as post-Harappan, and suggest it could be much earlier. Third, Shahi Tump-type spiral headed copper pins and stamp seals occur at Mundigak near Kandahar in periods IV and V, but there is a shaft-hole axe already in Mundigak Period III. Is the latter artifact type a chronological or cultural marker?

Upper Indus: Like Baluchistan and Sindh, new elements were making their appearance in the Harappa region and they were not localized. The Cemetery-H culture is no more localized aberrations but occupy large areas. The lower level graves in Cenettry H at Harappa contained extended inhumations with both typical Harappan pottery but also some innovations: new shapes and a new style of decoration. In the upper level of the cemetery, however, a new rite appears: urns containing the collected bones of individuals who had generally been cremated, along with pottery in a new style named Cemetery H after the graveyard. Cemetery H pottery appears to be a hybrid style in which both new and Harappan forms were made, often largely plain, with a single band or frieze of painted decoration. Many of the motifs used in the decoration, such as peacocks, animals, and pipal leaves, were familiar, while others, such as stars, dotted rings, wavy lines, and people with long streaming locks of wavy hair, were new.

Recent research at Harappa has shown that the transition from the Harappan to the Cemetery H culture was gradual, thus confirming what was been found in the excavations of Cemetery H in the 1930s (35). Chronologically, we place the postHarappan culture at Harappa (the Cemetery H culture) between 1900 and 12300 BC, a time when occupation of the city seems to have increased in density, producing overcrowding. Cemetery H pottery is widely distributed in the eastern Punjab and farther east, and it is known as far north as Swat.

During excavations of the circular platform area on Mound F numerous Cemetery H-type sherds and some complete vessels were recovered in association with pointed base goblets and large storage vessels that are usually associated with Late Harappa Period. A large kiln was also found just below the surface of the mound to the south of the circular platforms. The upper portion of the kiln had been eroded, but the floor of the firing chamber was found preserved along with the fire-box. Upon excavation it became clear that this was a new form of kiln with a barrel vault and internal flues.This unique installation shows a clear discontinuity with the form of Harappan pottery kilns, which were constructed with a central column to support the floor (20).

Gandhara Grtave Culture Burial, Loebanr

In Late levels on mound F, Vats found a cache of bronze tools and unfinished bronze artifacts. A very rich hoard of jewelry has also been found buried under the floor of one of the so-called 'workmen's quarters', perhaps dug in from a higher stratum.The figure-of-eight shaped silver plate brooch has 3 gold strips soldered on it, bent into the appropriate shape. Rows of miniature steatite beads, capped with gold, fill the spaces (see Chapter 17, under Jewelry). There were also a large number of gold beads and a conical cap and carnelian beads in this hoard. On the edge of mound F was found a mass of ash with partly burned human bones, as well as a quantity of stone mortars and pestles - representing the dismantling process? Vats , however, dismisses this as 'nothing more than rubbish' (2).

We notice a shift of Cemetery H settlement to the Bahawalpur area on one hand and into the Divide on the other hand. There are 50 sites of this culture in Cholistan and a similarly large number in the Divide. No habitation area has, however, so far been horizontally excavated. Settlements in the eastern region included sites, such as Mitathal and Ropar, that had been occupied earlier (Mitathat for instance, had been founded in the Early Harappan period) and others, such as Bara, that were new foundations. This spread went hand in hand with a gradual decline in the density of settlement from west to east. The pottery produced in postHarappan settlements in this region is said to display features of form, decoration, and fabric derived from many sources, including Mature Harappan, Sothi-Siswat Jodhpura-Ganeshwar, Cemetery H, and Jhukar wares and even Iranian wares. Other materials in these settlements include copper artifacts. Houses were generally rectangular and were constructed of mud bricks.

Anthropomorphic burial urn from Gandhara (Swat) Grave Culture, ca, 1500 BC

Although the Cemetery H culture encompassed a relatively large area, the trade connections with the western highlands began to break down as did the trade with the coast. Lapis lazuli and turquoise beads are rarely found in the settlements, and marine shell for ornaments and ritual objects gradually disappeared. At the same time, however, faience became increasingly common as a material for manufacturing jewelry in these regions and in the villages of the post-Harappan settlers farther east. A bead from a hoard at Harappa, dated around 1700 BC, was made of brown glass, the earliest known example of glass in South Asia.

The Gomal Grave Culture and the Pothwar Plateau: At about three sites on the Gomal river plain there occurs what Dani (37) has named the 'Gomal Grave culture'. At Gumla, for example, the Harappan-cum-Kot Dijian habitation (period V) was either abandoned or destroyed and is overlain by graves of this culture. Such graves also occur at Sarai Khola in the Taxila settlement complex. These 'graves' reveal a death ritual unique in ancient Pakistan. A round pit was dug about a meter and a half deep, and wood was placed at the bottom. Over this were placed, in sequence, the remains of sacrificed animals; a layer of wood and earth with provision for a fire chute; a layer of clay; a pile of wood with the dead body and personal objects like clay bangles and figurines of women, horses, or bulls, and stone tools; and a final sealing, layer of clay. This whole was set ablaze and not disturbed or opened thereafter. It was thus, in Dani's words, a 'grave cum funeral pyre'. Equally intriguing is the way some of the bodies were laid out in the graves. The head was tilted to the left and the mouth was wide open. The left leg was crossed over the right, and the left arm crossed the torso so that the two hands lay near each other. In the Taxila region the post-Bronze Age centuries are represented by this kind of death ritual at Sarai Khola. But at the Hathial mound the material culture has affinities with that of contemporary Swat (2).

Swat and the North-Western Region - the Gandhara Grave Culture. From about 1700 BC, cemeteries and villages in Swat (period IV) had a material culture which seems to have been a curious amalgam of elements from the Indus Valley, north-east Iran (grey burnished pottery, violinshaped figurines, the horse) and China (jade pendants, stone harvesters, and ornate bone pins). In time the region would receive steppe elements from Tajikistan, via north Bactria. These settlements, such as Katelai, Ghaligai, Loebanr, Timargarh, and Kalakoderay, all in Swat, are collectively known as the Gandhara Grave Complex. The funerary rites are distinguished by their diversity and by their regional and chronological variation.

The graves consist for the most part of an oblong pit geenerally with stone slabs to form a roof. The great majority of graves contain inhumations with one or two skeletons. The grave goods included distinctive plain pottery. These included tall 'champagne goblets', pedestal cups, beakers with flared mouths, bottles with tall narrow necks, occasional jugs with raised lips, spouted pots, one curious triple pot on three stems rising from the base and terracotta figurines. Metal objects included those of copper or bronze, most commonly pins with decorated tops. Two horse burials in separate graves, alongside their master have been found at Katelai. This site has also yielded a bronze model of a horse. All these grave goods are comparable with those found in Iran and Caucasus.

Complete bodies were placed on their backs with their knees bent, in pits capped with stone slabs and sometimes lined with drystone walling. People were generally buried singly or in pairs. Children were sometimes interred in small slab cists. Cremated bones were placed in pottery cists or urns, some with pinched and cut-out decoration in the form of a face, or directly in the grave. The associated grave goods included pottery violinshaped human figurines, and metal objects, especially pins with elaborate heads. Many of these were closely similar to artifacts from sites in northern Iran, the BMAC, and the Caucasus, and it is thought that this reflects the arrival of numerous small groups of immigrants over the course of the second millennium. This is supported by the presence of horses in a few graves and by depictions of horses on pottery.

There are three major groups of pottery that are of significance. The first group is very scarce at Loebanr but rather more frequent at Birkot Ghundai: it is a red pottery shaped on the fast wheel and painted black. Much of the painted decoration is strongly reminiscent of that at Cemetery H, in that it is beautifully executed and has a rich repertoire of subjects like the three-leaf spray, the star, the symbol of the eye and the peacock. The second group is a brown to grey, relatively coarse pottery, shaped on the turntable, with rippled or notched rims. The third, about 60 per cent of the Loebanr **III** pottery, is grey-black, shaped on the turntable, and often burnished. The cups on high/squat pedestals in this ware bear a very strong resemblance to thosefound in north-eastern Iran at the Gurgan sites and at Tepe Hissar III.

It has, thus, been inferred that this period saw two cultural 'waves' into Swat, represented by the fine painted red ware and the grey-black pottery respectively. And that is not all. There is influence from a third direction, embodied in the occurrence of about three jade ornaments, a few stone knives of rectangular shape called 'harvesters', and double-headed bone pins-all of which are characteristically Chinese too, has a few Meanwhile, in the graveyards, there is more than one mode of disposal of the dead: inhumations and post-cremation burial. In this context, too, the excavators refer to two tribes or two migrations into Swat. Despite these foreign elements, there was also continuity, with settlements of pit houses whose inhabitants practiced mixed farming, though at some sites rice was now grown as well as wheat and barley, and grapes as well as pulses. Links continued with the Taxila Valley to the south, and with Kashmir where rice cultivation also began and a few copper objects now appeared The rural economy revolved around the cultivation of wheat, barley, lentil, and peas, all known to the Harappans, but also rice and grapes. Cattle, sheep and pigs were raised. The tools recovered are of ground stone and polished bone in the main. The latter include a range of expertly-made pins and spatulae. Metal is scarce, but there are ornaments of gold, shell and faience.

The post-Harappan Scene in the Neighborhood: Despite a precipitateous decline in an urban economy, a noticeable decrease in longdistance trade, and an unravelling of a complex socio-political system, the post-Harappan Pakistan was not isolated from its neighborhood. In fact, this period

wrought a profound change in the genetic make-up of the population and introduced a fundamental cultural change in Indus society. The Indus Age was coming to its end and in its place a new cultural era was taking birth. A number of ‘foreign’ peoples seems to be making inroad into the Greater Indus Valley from the southwest as well as from the elements. (Neolithic Burzahom, artifacts with Chinese affinity). northwest. The migration of the so-called “Aryans” is one celebrated event that belongs to this period. Equally important is the substantial movement of the Indus population towards the Indo-Gangetic Divide which had a tremendous implication for agriculture and pastoralism in the Ganga-Jamuna Doab. A similar cultural impact took place in Kutch and Saurashtra as well. In the followings we shall touch upon a few points, relegating the Aryan question to a separate volume.

The Indo-Gangetic Divide - Punjab, Haryana and Northern Rajasthan: The Indo-Gangetic Divide, that is, the Indian Punjab, Haryana, Ghaggar flood plain, and northern Rajasthan, is as important in the study of the Late- and post-Harappan cultures as the area in Kutch and Saurashtrta, described below. A few important Harappan sites, such as Kalibangan, Bananwali, Rakhigarhi, existed in this general area, where some local cultures, such as Bara and Sothi-Sisal, were also developing during the period of the Harappan Civilization. The Late-Harappan culture often overlapped these local cultures and occasionally coexisted with them at some sites. As the Harappan Civilization started to disintegrate, these local cultures saw their re-emergence all over the area. Some of the vestiges of the Harappan material cultures continued for sometime but eventually disappeared completely.

Sonawane and Majumdar have discussed the post-Harappan cultures in Indian Punjab and Haryana in some details (39) and confirm the above depicted scene. From their account, it is clear that parts of Haryana and Indian Punjab was inhabited by some Pre-Urban communities before the advent of Urban Harappans in this region and continued their occupation even during the urban phase. These are the Kalibangan I and the Bara Ware cultures which had an independent existence all through the Harappan occupation and came into prominence again during the Post-Urban phase. It was during this Post-Urban phase that the region was penetrated by agropastoralists from the Indus Valley.

The origin of the Bara Culture is yet unknown but it is amply clear that it was well established by the time the Urban Harappans migrated to this region. At most of the sites of this region Bara Ware is found interlocked with the Urban Harappan pottery, though it is only at the site of Bara that its existence before the Urban Harappan contact has been unearthed. The middle levels at Bara (where it shows contact with the Urban Harappans) gives a date of 2140 BC. One can, therefore, assume that the Bara people inhabited the site of Bara not later than 2500-2400 BC.

It appears that there was an abandonment of a number of important settlements and a clear disruption in the Urban Harappan culture and the distribution of the human population in this part of the Indus peripheries was changed in a significant way. However, there was an increase in the number of post-Harappan settlements that witnessed a return to a cultural mosaic not unlike the one found during the Pre-Urban phase in this area (4).

To understand the situation in Punjab, one has to refer back to the advancements taking place in Harappan studies in the core region of the Harappan Civilization. The analysis of data from Mohenjo-daro, Jhukar, Amri and Chanhu-daro shows that the Harappan Civilization in the Sindh region transformed into, or replace by, what is known as the Jhukar Culture. Similarly, the excavations at Harappa by Dales, Meadow and Kenoyer suggest that the Period IV shows elements of transition towards the so-called Cemetery H culture, which is fully manifested in Period V. From the distribution

of sites it appears that the Jhukar Culture sites are found more in the lower Indus region while most of the Cemetery H related sites are concentrated in Punjab, Cholistan and Sutlej-Beas Basin. In case of Cemetery H, the repertoire of designs and the animal and floral motifs are usually encountered with the Harappan ceramic assemblage, and hence, the Cemetery H people culturally do not seem to have been different from the Harappans except that few vestiges of urbanization there remain.

In Haryana, particularly in the valleys of the flood plain of Ghaggar, the settlements representing the post-Urban Harappan phase are comparatively more frequent than the Urban phase. There are many small rivers in this region which are part of the Ghaggar system. Unlike the middle and southern Ghaggar valley, water was not much of a problem during Harappan times in its upper region and hence we find a good deal of evidence relating to the post-Urban Harappan phase. It was observed that most of these later sites are located away from the perennial rivers or found generally outside the flood plains of seasonal streams. The excavations carried out at Banawali, Balu and Mitathal revealed a cultural sequence starting from Pre-Urban to Post-Urban through the Urban phase, while Siswal excavations showed a sequence up to the Urban Phase. On the other hand, the site at Bhagwanpura tells the story beyond the Post-Urban phase, to a point of overlap between an amalgam of various trends derived through a long process of devolution from the Harappan, Baran and Kalibangan cultures to the Painted Grey Ware culture (39).

In general, there is a continuous occupation of Chalcolithic people without any cultural break in this area. The Urban Harappan occupation is immediately followed by the post-Harappan occupation. It is characterized by the disappearance of the classical Urban Harappan cultural manifestation. Typical shapes and decorations of the vessels are not seen any more. Kalibangan and Siswal continues in this period with little modification and improvement. Bara Ware which made its appearance during the Urban Harappan phase in the Indus Valley becomes predominant now. Most of the antiquities of the Urban Harappan occupation continue during this phase also. Faience artifacts are found in large quantities. This material was largely used for bangles with incised designs, but beads and other objects are also known. One of the interesting finds is a faience figurine of a stag with a horizontal hole recovered from Mirzapur. Steatite beads become rare and only a few disc-shaped beads were found from Mirzapur. The copper and bronze vessels, alabaster cups and objects of lapis lazuli, shell and ivory are also rare and absent in the later phase. As at Dadheri, Nagar and Katpalon, Bhagwanpura also showed the overlap of the Late Harappan with the Painted Grey Ware.

In short, the post-Harappan Culture in this region is characterized by Bara Ware with the addition of the Pre-Urban Harappan and some Cemetery H wares. By this time the Bara Culture has adopted many a trait from the Harappans and it is difficult to distinguish between the two cultures. On this account it is pertinent to ask whether the postHarappan phase in this region was actually postHarappan, a complex which was transformed from the Urban Harappan after losing all the urban traits or was it a modified form of the Bara Culture? The emergent picture shows that it was the Bara Culture which continued during the post-Harappan times, continuing with some of the features of the Harappans, and dominated the Sutlej and Ghaggar valleys in the post-Harappan era of the core region.

In this region the post-urban site of Hulas is remarkable for having yielded good evidence on the agricultural economy, which could be termed 'transitional'. There was not only cultivation of crops like barley, wheat and peas in the Harappan (and western Asiatic) tradition, but also of indigenous crops like rice and ragi, plus pulses including green gram. A sudden increase in small settlements indicates an equally rapid change from predominantly huntinggathering subsistence system to

agriculture and pastoralism. The increase in the number of settlements obviously did not come merely because of the immigration of the Indus people from the west but also from an inherent change in the subsistence economy.

Neighborhood to the South-East - the postHarappan Kutch and Saurashtra: In the postHarappan period in Kutch and Gujarat the number of sites drops by one-third. There is also a significant drop in the average size of sites. Total settled area, as determined from the settlement surveys, is reduced to half. These are definite indicators of deep change in the system of settlement and, probably, subsistence and the socio-cultural system generally. But there is another theme in the transformation process here. At Rojdi the site was expanded and rebuilt just at the time Mohenjodaro was being abandoned, and Harappa came to an end as an urban centre. Thus, while we have evidence for fewer and smaller villages, at least some of those that survived have signs of a sound economic base and did not depend on the Harappan economy. At about 1900 BC, the signs of manufacturing and trade disappeared, and Lothal shrank to a squatter's settlement.

A similar fate befell Kuntasi. Both indicate the collapse of the urban culture in the core area of Sindh. Lothal, Kuntasi, and Dholavira were essentially urban "colonies" of the Sindhi Harappans, which made them vulnerable to severe change at the beginning of the Post-urban Harappan. Rojdi and other places that were farming communities, not deeply involved in the acquisition and processing of materials or in the transport that was part of the commerce, were insulated from the catastrophic changes in Sindh. But places such as Dholavira, Kuntasi and Lothal succumbed.

In Gujarat the transition to post-Harappan began early, perhaps by 2100 BC and continued a little longer, perhaps as late as 1700 BC. This region had always maintained a degree of local distinctiveness: for example, pottery styles characteristic of the pre-Harappan periods, such as Prabhas Ware, continued in use alongside Mature Harappan pottery. Sites like Lothal had been fully integrated members of the Indus ecumene; others, such as Somnath, less so. By the end of the third millennium, however, even previously well integrated sites such as Lothal were beginning to drop out of the Mature Harappan way of life. Instead of high-quality flint brought in from the Rohri Hills in Sindh, stone tools were now made of local stone such as jasper and agate. Mature Harappan pottery declined in quantity and was replaced by an increased quantity of traditional local wares, such as Prabhas ware, and by new wares, in particular Lustrous Red ware, a bright red ceramic that became dominant in Gujarat sites like Rangpur during the early second millennium and that was later also used farther afield in the Deccan, reflecting trade, population movement, or both.

The regional city of Dholavira declined and was then abandoned. It was re-occupied after perhaps fifty years as a small settlement of poor-quality houses that lasted for about a century before again being deserted. At many sites, such as Rangpur, brick architecture was abandoned in favor of other styles of construction: wattle and daub with a wooden framework, or stone foundations on which walls were built of mud, and in most cases thatched roofs. The construction of bathrooms and drains ceased. The warehouse at Lothal went out of use.

The earlier half of the second millennium saw a very considerable increase in the number of settlements. This probably reflects the change to new crops: Mature Harappan agriculture had used wheat and barley as the staple crops and in Gujarat native millets had also been important; now bajra and jowar, drought-resistant millets that were high yielding, free threshing, and well suited to the environment of Kutch and Saurashra, became increasingly important. Rice may also have been

cultivated at some sites, such as Rangpur. Patterns of sea trade through the Gulf altered as Mesopotamia experienced political and economic upheavals from around 2000 BC, causing a major retraction in its trade.

The change was, however, not abrupt and a continuity has been seen in the form of degenerated Harappan culture at most of the Harappan settlements. Therefore, keeping in view the radiocarbon determinations from different known sites and reanalysis of the excavated data it has been felt that the occupations during Lothal B, Rangpur IIC and III, Rojdi C, Kuntasi II, Padri IIIB, Prabhas Patan II and III, Vagad IB and IC and Dholavira stages VI and VII marked the onset of Post-Urban Harappan phase in Gujarat. Apart from these excavated sites, where habitational strata have shown continuity in Harappan occupation from Urban to Post-Urban phases, the excavations at Kanewal, Nesadi, Ratanpura and Oriyo Timbo demonstrate an independent existence of this Post-Harappan phase.

Though certain pottery forms like ‘Indus goblets’, beakers and ‘S’ shaped jars almost disappear, other characteristic ceramics, including perforated jar, continue with slight changes in shape and decoration. The fabric, however, became coarser and in painted designs linear patterns became common in contrast to the diagnostic Harappan naturalistic decorations. The convex-sided bowls developed a blunt or even sharp carination at the shoulder. The stem part of the dish-on-stand became squat while the projected dish acquired a beaded rim. Lustrous Red ware, characterized by high polished red slip became the prominent ceramic type. The white painted Black and Red ware also became more conspicuous by its presence. The Prabhas ware, distinct from Lustrous Red ware, treated with pinkish or orange wash with purple or dark brown painted designs mostly set in panels and registers suggest regional innovation. Graffiti on pottery, some of which resemble the signs of the Harappan script also occur, reminding us of the continuity of the earlier tradition, though in a reduced frequency. Although classical Reserved Slip ware totally disappeared, its crude variant as an imitation was found lingering at a few sites.

This transformation is not reflected in ceramics alone. Among other artifacts, long chert blades, a material that had been imported from the Sukar Rohri hills of Sindh, was no longer available because of the steep fall in trade and were substituted for by smaller blades of locally available stone. Perhaps for the same reason, the cubical chert/agate weights, so diagnostic of the Urban phase are no longer found and replaced by truncated spherical weights of sandstone and similar material. Though terracotta beads become common, simple varieties of semi-precious stone beads and shell objects did continue to some extent because of the local availability of the required raw material. The absence of steatite micro and disc beads, in spite of local availability of raw material in certain parts of the region again reflects on the restricted movement of the artisans. In addition, there are stray occurrences of terracotta triangular cakes and sporadic finds of stamped seals with only inscriptions, devoid of the usual animal or other figure depictions. The overall decline in the material culture of this phase is also reflected on the use of metal objects.

The deterioration in settlement pattern is also very explicit as compared to that in the earlier phase. The acropolis, warehouse and “dockyard” at Lothal were abandoned. Even the house floors were now made of brickbats collected from earlier constructions. The situation of Rangpur is not much different. At Dholavira, during phases VI and VII, the one-time city shrank into small settlement confined to the Citadel and southern margin of the Middle Town where they delimited it by raising a wall of an entirely different workmanship. Like Lothal, there was no control over planning of the settlement. Ordinary type of circular residential structures without use of bricks again suggest the

adverse economic conditions of the people. Stone structural remains found at Rojdi, Kuntasi and mud constructions at Prabhas Patan and Padri reflects on the overall decline in the Harappan planning of settlement. The archaeological data recovered from these sites witness clear signs of shrinkage in the size of settlements during this cultural phase.

Thus, the cultural variables seen in subsistence and settlement patterns show a lack of standardization and homogeneity in its material culture during this Post-Harappan phase. The small sizes of settlements with non-descriptive architectural pattern, reduced number of items of material culture and thin habitational deposits corroborate this assumption. Although, there was certainly a decline in the material prosperity, a basic continuity of the Harappan tradition was still observed in the form of some lingering features of the Harappan culture transforming the urban way of life into a rural one. As a result, the social fabric of the Post-Urban Harappans became weak and economic conditions were geared more to meet the subsistence requirements than to gain any surplus. Because of week political power, it witnessed a process of decentralization and localization, giving rise to regional cultural expressions like Lustrous Red ware and Prabhas ware. The villages of this period are found scattered all over Saurashtra and also on the coast of mainland Gujarat. Along with villages there were also seasonal camps of cattle or sheep herders.

Indo-Iranian Borderlands: Around 2200 BC, Shahr-i Sokhta (eastern Iran) and Mundigak (Southern Afghanistan) went into decline, both shrinking very significantly in area. Both suffered attacks during this period: Mundigak was temporarily abandoned, then briefly reoccupied before being finally abandoned. At Shahr-i Sokhta, the Burnt Building, a large mud brick structure built around a courtyard, which was perhaps a palace, was destroyed by fire: A bronze spearhead and an unburied body have been found among the debris. The settlement was reoccupied by squatters but abandoned around 1800 BC. This coincided with a similar decline in Turkmenia where prosperous Bronze Age towns such as Altyn-depe and Namazga also shrank very considerably, as did the area of the Namazga culture to which they belonged.

The Neighbors to the North-West - BactriaMargiana Archaeological Complex (BMAC): In the time period around 2200BC a new culture, the Bactria-Margiana Archaeological complex, or BMAC was developing in northern Afghanistan. Some new settlements appeared first in the Murghab delta in Margiana and gradually extended into other oases of the region. They were established along small rivers, where their inhabitants reared domestic animals and used floodwater and canal irrigation to raise crops. Associated material shows a high level of craftsmanship, with fine-quality, undecorated wheel-thrown pottery and with abundant metalwork, including many weapons and stone and bronze filigree seals. A fortified settlement dominated each region: These were either rectangular or square, around a hectare in area, and enclosed in a massive mud brick wall with towers. This culture spread into adjacent regions to the west and south, occupying the areas formerly of the Helmand culture and the urban cultures of Turkmenia.

At the Indus trading outpost of Shortugai, Bactrian material was present during the last period of Indus occupation, when lapis lazuli processing ceased. In the subsequent period the settlement became part of the BMAC. By 1700 BC the distinctive BMAC material was no longer present in its core region in the Amu-Darya (Oxus) region but was known in areas farther west and east, including Baluchistan and the northwestern regions of the Greater Indus Valley.

There is now plenty of archaeological evidence of new Central Asian elements appearing in the Indus

Valley. This influence is not limited to the Lower Indus zone but goes beyond even up to the Divide. The bronze cosmetic flagon known at Hissar, Altyn-depe and in Bactria, occurs at Chanhudaro as a beautifully fluted piece, in a probable Jhukar Culture context. Round bronze mirrors with tangs for fitting into wooden handles, as at Hissar, Altyn-depe, Gonur I, Sapalli, Dashly, Shahdad and Khinaman, and Mehi - some of them with a handle shaped as a human body - also occur at Mohenjodaro and Harappa.

The beautifully cast, socketed adze-axe of Gonur I has counterparts at Hissar, Shahdad, Kirman and also Mohenjodaro. Harappa and Chanhudaro each have a single bladed socketed axe (Socketed axes were not part of the typical Harappan repertoire). Exquisite bronze animal-headed pins or 'wands' at Dashly and Hissar have a counterpart in the latest stratum of Harappa in an 'antimony stopper rod' surmounted by the figure of a dog biting the ear of a goat; and at Mohenjodaro where a rod is surmounted by an antelope. There are also compartmented seals whose faces bear raised geometric designs, from Mohenjodaro, and the white steatite stepped seal with a stylized eagle from Harappa has Bactrian connexions.

Indus Heritage: We have seen the manifest decline of the Harappan material culture in the first few centuries of the second millennium BC throughout the core area of the Indus Civilization as well as in its peripheries in the east and the west. Still, this collapse of the Harappan Civilization did not lead to the total eclipse of all the traits of this civilization and many of its features were observed in the later cultural developments in Pakistan as well as in the adjoining areas of India. This aspect of the Indus Civilization is sometimes exaggerated to a point of absurdity but the fact still remains that a faint shadow of the Indus Civilization is no doubt observable in the post-Harappan culture, even to the present time.

For one, agricultural techniques, and the practices of rearing domestic animals, survived. For another, it is likely that the Harappan peasants would have retain their religious beliefs - the power of the mantras, the efficacy of the amulets, the musing of the shamans, even the system of social stratification on the basis of caste.The priests of the Harappan urban centers were part of a highly organized tradition and their traditions could have been transmitted to the post-Harappan cultures where it could have been transformed into the Hindu Brahmanical order. This is not to say that the classical Hinduism originated in the Harappan or post-Harappan cultures.

The folk communities also retained some of the craft traditions as is evident from the pottery and tool making traditions. Many aspects of domestic life, like the house plans, disposition of water supply and attention to bathing survived in some settlements of the subsequent periods. The traditional weight and currency system of Pakistan and India, based on the multiple of eight as the unit, was already present in the Harappan Civilization and it might have something to do with the subsequent system. The techniques of making potter's wheel in modern India (the ‘fly-wheel’) and Pakistan (foot driven wheel) are similar to those used by the Harappans. Bullock carts and boats used in modem Pakistan were already present in the Harappan cities.

Even the objects like the typical Harappan house plan of a central courtyard surrounded by rooms seems to have continued from the Harappan times. The binary system of weights of the Harappans followed 1, 2, 4, 8, 16, 32, 64... 128(X), with fractions in one-third. Till recently, the Indian 1 seer = 16 *chattacks* and 1 rupee = 16 *annas* basically followed the same system. Even the *Arthasastra's (angula* 17.86 mm) seems to have been derived from the Harappan measuring unit of 17.7 mm.

Thus the Harappan legacy is not its city life, but rural technologies or peasant science, knowledge that was within the control and experience of the ordinary household or village - elements of culture that had been internalized and passed down generations within the family and the community (2). The people and the technologies that cater to non-elite populations continued. In a traditional society like ours, hoary traditions continue along with newly acquired fashions and technologies.

The Indus heritage is routinely exaggerated by some Indian scholars. This is, nevertheless, unwarranted. First, the increase in the number of "Harappan" settlements in India across the Divide may not be Harappan after all. Instead, they are more like Neolithic settlements with some minor vestiges of the Indus rural culture. Second, there is no obvious signs of a "cultural continuity" between the Harappan Civilization and the rise of villages in the post-Harappan period. Third, there is long period of time between the end of the Indus urbanism and the rise of towns and cities in the GangaJamuna plains. Fourth, the re-emergence of towns and cities in the subcontinent did not begin in the Gangetic plains, cities re-emerged first in the north of Punjab, in the so-called Gandhara country and these cities, such as ancient Taxila, had no cultural familiarity with any of the Harappan cities.

Causes of Decline: The above discussion would naturally evoke speculations for the causes of the cultural changes towards the deterioration and the end of the Harappan Civilization. Catastrophic climatic changes, floods , vagaries of the Indus river, Aryan invasion, violent tectonic uplifts in the lower reaches of the Indus resulting in the pooling of flood waters, an overly taxed subsistence system, and an over-all decline in the international trade in the beginning of the second millennium BC are some of the proposed explanations. However, no single cause can be isolated as an explanation to the process of this profound cultural change or the end of a civilization. All these theories point towards a cultural devolution rather than an abrupt end and its rate and configuration varied from region to region, depending on a number of local factors. This is largely a theoretical discussion and a lot has been written on it. We prefer to defer this debate to the next volume (Vol. IV. *Theoretical and the Abstract*) of this work.

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40. Lal, B.*B. The Earliest Civilization of South Asia: Rise, Maturity and Decline. 1997.*

Chapter 21

Suggested Readings

There is a vast array of academic literature available that directly touches upon the material culture of the Harappan Civilization. These include basic surveys of the Indus Civilization, monographs on special topics, and several reports on archaeological surveys and excavations referred to in the text. Book-length descriptions are many; some good, and some average, some facile repetitions. We list some of the these in the followings. The material is listed in chronological order, starting with the most recent ones. The older books by Wheeler, Mackay, and Piggott are still useful sources on selected topics. There are some other books and monographs that shed useful light on the Indus Civilization indirectly, some of them have been included in the list. The titles which are overtly theoretical have been avoided, as they are to be listed in the bibliography of the next volume.

The Indus civilization : an interdisciplinary perspective
2007; D P Agrawal
iSBN 9788173053108

Finding forgotten cities : how the Indus civilization was discovered
2006; Nayanjot Lahiri
ISBN 9781905422180

Indus civilization : text & context
2006; Osada, Toshiki,
ISBN 9788173046827 (v. 1); 9788173048210 (v. 2)

The ancient South Asian world
Jonathan M Kenoyer; Kimberley Burton Heuston 2005; ISBN 0195222431

Rethinking the Indus : a comparative reevaluation of the Indus civilisation as an alternative paradigm in the organisation and structure of early complex societies
2011; Edward Cork
ISBN: 9781407307718

The ancient Indus : urbanism, economy, and society
2010 ; Rita P Wright
ISBN 9780521576529

Current studies on the Indus civilization 2010; Toshiki Osada; Akinori Uesugi ISBN 8173048592

The Ancient Indus: Urbanism, Economy, and Society
2009; Rita P. Wright
ISBN 978-0521572194

The ancient Indus Valley : new perspectives 2008; Jane McIntosh
ISBN 9781576079072

Harappan civilization : homogeneity and heterogeneity
2005; Vijneshu Mohan
ISBN 9788176464758

Art of the first cities : the third millennium B.C. from the Mediterranean to the Indus
2003; Joan Aruz; Ronald Wallenfels
ISBN 1588390438,

Indus ethnobiology : new perspectives from the field
2003; Steven A Weber; William R Belcher ISBN 0739106090

Understanding Early Civilizations: A Comparative Study
2003; Bruce G. Trigger
ISBN 978-0521705455

Indus ethnobiology : new perspectives from the field
2003; Steven A Weber; William R Belcher ISBN 9780739106099

The Ancient Indus Valley 2008; Jane R. McIntosh ISBN 9781576079089

The Indus civilization : a contemporary perspective
2003; Gregory L Possehl
ISBN 9788178292915

South Asia : an environmental history 2008; Christopher V Hill
ISBN 9781851099252

Early India : from the origins to AD 1300 2003; Romila Thapar
ISBN 9780520238992

Bronze and Iron Ages in South Asia . 2003; Agrawal D.P. and J.S.Kharakwal ISBN 9788173052521

Indian archaeology in retrospect , Volume II (Protohistory - Archaeology of Harappan Civilization)
2002; S Settar; Ravi Korisettar
9788173043208
ISBN 9780812234176

India, an archaeological history 1999; Dilip K Chakrabarti
ISBN 9780195645736

Ancient cities of the Indus valley civilization 1998; Jonathan M Kenoyer
ISBN 9780195779042

Bronze Age economics : the beginnings of political economies
2002; Timothy K Earle
ISBN 9780813338774

Archaic states
1998; Gary M Feinman; Joyce Marcus ISBN 0933452993

The Indus civilization : a contemporary perspective,
2002; Gregory L Possehl,

ISBN 9780759101722,

Origins of a civilization : the prehistory and early archaeology of South Asia
1997; Bridget Allchin; F Raymond Allchin

ISBN 9780670877133

The Indus civilization : including other copper age cultures and history of language change till c. 1500 B.C.
2002; Irfan Habib
ISBN 978818522966

Understanding Harappa : civilization in the greater Indus Valley
2001; Shereen Ratnagar
ISBN 9788185229379

Understanding Harappa : civilization in the greater Indus Valley
2001; Shereen Ratnagar,
ISBN 9788185229379

The decline and fall of the Indus civilization 2000;Nayanjot Lahiri
ISBN 9788175300347

Ancient metal technology and archaeology of South Asia : a Pan-Asian perspective 2000; D P Agrawal
ISBN 9788173051777

The end of the great Harappan tradition 2000; Shereen Ratnagar
ISBN 9788173043314

Early civilizations of the old world : the formative histories of Egypt, the Levant, Mesopotamia, India, and China
1999; Charles Keith Maisels
ISBN 9780415109758

The earliest civilization of South Asia : rise, maturity, and decline
1997; B B Lal
ISBN 9788173051074

Ancient Cholistan : archaeology and architecture
1997; Mohammad Rafique Mughal
ISBN 9789690013507

The earliest civilization of South Asia : rise, maturity, and decline
1997; B B Lal
ISBN 9788173051074

Beyond the Tigris and Euphrates : bronze age civilizations
1996; C C Lamberg-Karlovsky

Copper and its alloys in ancient India 1996; Dilip K Chakrabarti; Nayanjot Lahiri ISBN 8121507673

Cultural imperialism : Indus civilization in western India
1995; Madhukar Keshav Dhavalikar
ISBN 9788185016429

Handicrafts in the Indus Valley civilization 1995; Kumud.
ISBN 9788185078878

Copper and its alloys in ancient India 1996; Dilip K Chakrabarti; Nayanjot Lahiri

India, an archaeological history : palaeolithic beginnings to early historic foundations 1999; Dilip K Chakrabarti
ISNB 9780195645736

Mehrgarh : field reports 1974-1985, from Neolithic times to the Indus civilization
1995; Catherine Jarrige

ISBN 9698101113X
Indus Age - the beginnings 1999; Gregory L Possehl

Cultural imperialism : Indus civilization in western India
1995; Madhukar Keshav Dhavalikar

ISBN 9788185016429 ISBN 9788870770254

Proto-historic pottery of Indus valley civilisation, study of painted motifs : illustrated with photographs, charts, and drawings
1994; Sudha Satyawadi
ISBN 9788124600306

Kulli : an exploration of ancient civilization in Asia
1986; Gregory L Possehl

ISBN 9780890891735

From Sumer to Meluhha : contributions to the archaeology of South and West Asia in memory of George F. Dales, Jr.
1994; Jonathan M Kenoyer
ISBN 9780964399327

Origins of the Bronze Age oasis civilization in Central Asia
1994; Fredrik T Hiebert

ISBN 9780873655453
Harappan civilization : a recent perspective 1993; Gregory L Possehl

Figuren, Schmuckformen und Täfelchen der Harappa-Kultur (in German)

1985; Paul Yule
ISBN 9783406307256

Pre-Harappan cultures of India and the borderlands
1985; Shashi Asthana

ISBN 9788185016139

Cultural Imperialism: Indus Civilization in Western India
1985; M.K. Dhavalikar,
ISBN: 9788185016429

Early civilizations of the old world : the formative histories of Egypt, the Levant, Mesopotamia, India, and China
1999; Charles Keith Maisels
ISBN 9780415109758

Art of the Bronze Age : southeastern Iran, western Central Asia, and the Indus Valley
1984; Holly Pittman
ISBN 0870993658

Mohenjo-Daro : Stadt der Brunnen und Kanäle : Wasserluxus vor 4500 Jahren
1993; Michael Jansen
ISBN 9783922671022

Explorations on the Makran Coast, Pakistan : a search for paradise
1992; George F Dales; Carl P Lipo

ISBN 9781882744008

Indus faience and terracotta mouldings from Harappa
1984; John Newberry

Frontiers of the Indus civilization 1984, B.B. All
ISBN 9780856722318

Frontiers of South Asian Prehistory, *1984;* Lal, B.B. ed.,

Forgotten cities on the Indus : early civilization in Pakistan from the 8th to the 2nd millennium BC
1991; Michael Jansen
ISBN 9783805311717

From lineage to state : social formations in the mid-first millennium B.C. in the Ganga Valley
1984; Romila Thapar

ISBN 9780195613940

Harappa excavations, 1986-1990 : a multidisciplinary approach to third millenium urbanism

1991; Richard H Meadow
ISBN 9780962911019

Forgotten cities on the Indus : early civilization in Pakistan from the 8th to the 2nd millennium BC
1991; Michael Jansen; Máire Mulloy; G Urban ISBN 9783805311717

Antecedents of the Indus civilization 1982; F Raymond Allchin
ISBN 9780856722363

The rise of civilization in India and Pakistan 1982; Bridget Allchin; F Raymond Allchin ISBN 9780521285506

Indus civilization in Saurashtra 1980; Gregory L Possehl
ISBN 9780836428711

Recent archaeological discoveries in Pakistan 1988; Ahmad Hasan Dani
ISBN 9789231024665

Ancient cities of the Indus 1979; Gregory L Possehl ISBN 9780890890936

Bactria : an ancient oasis civilization from the sands of Afghanistan
1988; Giancarlo Ligabue; Sandro Salvatori

Essays in Indian protohistory 1979; D P Agrawal; Dilip K Chakrabarti

Archeology of Soviet Central Asia, and the Indian Borderlands
1979; Swarajya Prakash Gupta; Vadim Aleksandrovic Ranov

The pre-historic background of Indian culture 1960; D H Gordon

New light on the most ancient East. 1953; V Gordon Child
Ancient cities of the Indus 1979; Gregory L Possehl

The Archaeology of Afghanistan from earliest times to the Timurid period
1978; F Raymond Allchin; Norman Hammond ISBN 9780120504404

Prehistoric Baluchistan, with excavation report on Said Qala Tepe
1978; Jim G Shaffer

The lion river, the Indus 1975; Jean Fairley
ISBN 0381982726

Lothal and the Indus civilization 1973; S R Rao
ISBN 9780210222782

The copper bronze age in India; an integrated archaeological study of the copper bronze age in India in the light of chronological, technological, and ecological factors, ca. 3000-500 B.C., 1971; D P Agrawal

The roots of ancient India : the archaeology of early Indian civilization
1971; Walter Ashlin Fairservis

Boats and boatsmen of Pakistan. 1971; B Greenhill
The origins of civilization 1969; Carroll L Riley
ISBN 9780809306022

The Indus civilization; supplementary volume to the Cambridge history of India
1968; Mortimer Wheeler
ISBN 9780521095389

Indian civilization: the formative period; a study of archaeology as anthropology
1968; S C Malik

ISBN 9788120803282

Ancient Mesopotamia: portrait of a dead civilization,
1964; A Leo Oppenheim

Prehistoric India to 1000 B.C. 1962; Stuart Piggott
The Harappa culture and the West, 1961; Heinz Adolf Mode

Early Indus civilizations.
1948; Ernest John Henry Mackay; Dorothy Mary Simmons Mackay
2d ed., rev. and enl.

Five thousand years of Pakistan; an archaeological outline.
1950; Mortimer Wheeler

Chapter 22

Glossary

ACACIA: *Acacia* spp, a shrubby tree that thrives in drier regions of northern South Asia.
AGADE: Capital of the Akkadian empire. Ships from Meluhha were said to dock at its quays.
AHAR-BANAS CULTURE: A Chalcolithic culture in Rajasthan, contemporary with the Harappan civilization but probably not directly in contact with it.
AKKAD: The northern part of Babylonia (southern Mesopotamia).
AKKADIAN EMPIRE: The first state uniting the lands of southern Mesopotamia (Sumer and Akkad), founded by Sargon of Akkad in 2334 BC and enduring until 2193BC.
AMMONITE: A type of pale blue-green stone used for making beads.
AMRI: A settlement in Sindh occupied in the Early Harappan period. It was de stroyed by burning in the Transition period before being rebuilt in the Mature Harappan period.
AMRI-NAL PHASE: The Early Indus period in Sindh and southern Baluchistan, named after Amri in Sindh and Nal in the adjacent mountains.
AMU DARYA: A river in southern Central Asia and northern Afghanistan, also known as the Oxus.
ANATOLIA: Asiatic Turkey.
ANNEALING: heating then cooling gradually to toughen or release stress
ANTELOPE: Antelope hunted in the Indus region included blackbuck, four-horned antelope or chausingha, and nilgai.
ARAVALLIS: A range of hills running south of the Thar Desert in Rajasthan, an important source of minerals, particularly copper, but irrelevant to the Hardpans because of the intervening impediments of the Thar Desert.
ASSYRIA: Northern Mesopotamia.
ARID: Dry.
AVESTA: The sacred books of the early Iranians, comprising the *Older Avesta* and the *Younger Avesta*.
AZURITE: a blue copper mineral; hydrous copper carbonate
BABYLONIA: Southern Mesopotamia (Sumer and Akkad).
BACTERIA:A region in northern Afghanistan between the Amu-Darya and the Hindu Kush.
BACTRIA-MARGIANA ARCHAEOLOGICAL COMPLEX (*See* BMAC.).

BACTRIAN CAMEL: The two-humped camel *(Camelus bactrianus)*, domesticated in southern Central Asia during the third millennium, when it was present at Shahr-i Sokhta. It was probably brought into South Asia by BMAC traders and raiders in the early second millennium, when it was present at Pirak.

BADAKSHAN: A district of northern Afghanistan including the Kokcha gorge, source of lapis lazuli in antiquity.

BAHAWALPUR: The south-easdtern part of the Punjab Province of Pakistan, a territory west of the Ghaggar-Harka river, now dry.

BAJRA: Pearl or bulrush millet *(Pennisetum typhoides)*, introduced from Africa during the early second millennium.

BALAKOT: A small (2.8-hectare) town in eastern Makran concerned mainly with fishing and shell bangle making.

BALUCHISTAN: A province of Pakistan;the mountainous region to the west of the Indus Valley, which
forms the eastern end of the Iranian plateau.

BARASINGHA: The swamp deer, *Cervus duvauceli*.
BITUMEN: Natural asphalt, used particularly as an adhesive and a water-proofing material.
BLACKBUCK: An antelope *(Antelope cervicapra)*.
BLACK COTTON SOILS: Volcanic lava soils found in the Deccan, Kutch, Saurashtra, and some parts of mainland Gujarat, on which cotton is often grown. They are fertile and water retentive. Their tendency to crack during the dry season causes a certain amount of mixing of the upper soil layers; they are therefore said to be self-plowing.
BMAC: The Bactria-Margiana Archaeological Complex, which occupied northern Afghanistan in the late third and early second millennia BCE, and colo- nized Seistan. Its people were in contact with the Late Harappan and other Chalco lithic cultures of northern South Asia.
BOLAS: A weapon, used particularly in the ancient Americas, for catching animals. It consisted of one or several lengths of rope to which stone balls were attached, and was thrown to entangle an animal's legs, bringing it down. It has been suggested that the Harappan perforated balls, which are usually called mace heads, may have been part of such a device.
BRAHMI: The alphabetic script developed in the later first millennium BCE from a West Semitic script, ancestral to all later Indian scripts.
BRAHUI (Brohi): An language spoken in southern Baluchistan.
BREAD WHEAT: Free-threshing wheats suitable for making bread because of their high gluten content: *T. aestivum vulgare*, clubwheat *(T. aestivum compactum)*, and shot wheat *(T. aestivum sphaerococcum)*, the latter being the variety most used in South Asia.
BRISTLEY FOXTAIL MILLET: A small millet *(Setaria verticillata)*, probably cultivated in Mature Harappan Saurashtra.
BROOMCORN MILLET: Common or broomcorn millet *(Panicum miliaceum)*, probably introduced from the Namazga area, possibly via Shortugai, though it was not certainly cultivated in Harappan times.
BROWNTOP MILLET: A native millet *(Brachiaria ramosa)*, cultivated in Mature Harappan Saurashtra.
BUND: A small dam or wall, usually constructed of earth and rocks, built to retain water, generally for irrigation. The gabarbands of Baluchistan, which may have been built from pre-Indus times onward, sometimes involved a stepped series of small L-shaped platforms, the long side stretching out into the stream to divert a portion of the water and suspended alluvium on to a small field in the base.
BURIN: A sharp instrument, usually a flint blade, with an angled cutting edge, typically used for engraving.
BURUSHASKI: A language isolate, spoken in the Western Karakoram region of the Himalayas.
BURZAHOM: A settlement of the Northern Neolithic culture.
CARNELIAN: Also known as sard, a distinctive red stone favored by the Harappans for making beads. Naturally occurring carnelian is rare. To produce it artificially, yellow chalcedony containing iron oxide was repeatedly heated to alter its color. This could produce a range of shades from orange to deep red.
CEMETERY H: The cemetery associated with the Late Harappan period at Harappa. The lower level shows continuity of local practices, while there are marked changes in the upper level.
CEMETERY H CULTURE: The culture of the Late Harappan period in the Punjab and areas to its

north and east, named after the later cemetery at Harappa.
CEMETERY R-37: The cemetery at Harappa belonging to the Mature Indus period.
CHALCOPYRITE: copper iron sulfide
CHAGAI HILLS A mineral-rich area in western Baluchistan exploited particularly by the people of Seistan. It is presently the area of copper ore mining.
CHANHU-DARO: A small (4.7-hectare) town located on the Indus River about halfway between Mohenjo-daro and the sea. Certain features, such as its baked brick architecture and heavy involvement in industrial activities, in- cluding the manufacture of some very specialist products such as long car- nelian beads, make the town seem like an industrial and administrative satellite of Mohenjo-daro. Like the latter, it was probably founded in the context of communications along the
CHANK: A shellfish shells were mainly used for making bangles, but also libation vessels and trumpets. **CHATTING:** A rain-fed river daring the Siwaliks, in Indian Punjab.
CHITAL: The spotted deer *(Axis axis)*.
CHLORITE A form of steatite, used particularly to manufacture fine bowls that were widely circulated during the third and early second millennia. The *serie ancienne* bowls were manufactured at Tepe Yahya and probably at Jiroft on the Iranian plateau, and at Tarut in the Gulf. These are also known as the Intercultural Style of vessels because they enjoyed a very wide distribution. Later styles were mainly manufactured in Oman.
CHOLISTAN: A part of the Thar desert in eastern Pakistan, encompassing most of the Bhalwalpur region.
COPPER HOARDS: Hoards of very distinctive copper artifacts, including antenna-hilted swords, found in the Ganges-Yamuna doab and Rajasthan. It took archaeologists many decades to discover the evidence that linked these hoards with the makers of OCP (Ochre-Colored Pottery) and to establish that the culture they represented dated to the earlier second millennium.
CYLINDER SEAL: A cylinder, usually of stone inscribed with a design and written text that could be endlessly reproduced by rolling it across wet clay. Cylinder seals were the characteristic product of Mesopotamia, contrasting with the square stamp seals of the Indus.
DAMB SADAAT: A settlement in central Baluchistan that gives its name to an Early Harappan culture related to Kot Diji.
DANCING-GIRL A famous bronze statuette discovered by Mackay at Mohenjo-daro depicting a naked girl in a loose-limbed and provocative pose. This stance led to her being known as the Dancing-girl, though she is not dancing but standing.
DEODAR: The Himalayan cedar *(Cedrus deodara)*, a tree that grows in the mountains of the northwest, at elevations above 1,200meters. Its aromatic wood is extensively used in the construction of buildings and boats and for making coffins.
DHAND: A lake created or enlarged by seasonal rainfall or flooding. Dhands include seasonal lakes in the Cholistan Desert, most of which become saline as their waters evaporate; lakes Indus River highway.
(Turbinella pyrum). Chank in Sindh and the Indo-Gangetic doab, forming after the inundation in parts of old levees and in dried-up or abandoned river beds; and pools and lakes in depressions forming after the inundation or the monsoon, including the Nal Lake in Gujarat, but also Lake Manchar and other perennial lakes that expand and contract annually.
DHOLAVIRA: The Harappan city in Gujarat, founded in the Early Harappan period and occupied for more than a millennium, though it declined in the Late Harappan period and was eventually abandoned. It is best known for its signboard, its remarkable citadel, and its impressive water tanks.
DIVIDE: The narrow corridor along the piedmont of the Siwalik hills that connects the Indus plain with the Ganga-Jamuna plain.

DILMUN: The name by which Bahrain and adjacent areas were known to the Mesopotamians in the third millennium; it also referred to Failaka in the early second. Dilmun was an important entrepot, trading with Mesopotamia, Magan (Oman), and the Harappans.
DK AREA: A residential area in the northeast of Mohenjo-daro's Lower Town, excavated by K. N. Dikshit from 1924.
DOAB: The area between two rivers, a term used particularly of the land between the Ganges and the Yamuna, but also more generally. The areas between the rivers of the Punjab are also named doabs, of which the Sindh-Sagar doab between the Indus and the Jhelum is the largest.
DRAVIDIAN: The language family to which belong the languages of South India and a few in other parts of the subcontinent. It is possible that some Harappans spoke a Dravidian language.
DRISHADVATI: A Vedic name given to the Chautang River, one of the main rivers contributing its waters to the Ghaggar-Hakra system.
DROMEDARY: The one-humped Arabian camel *(Camelus dromedarius)* was domesticated in Arabia sometime during the second or possibly third millennium, probably for its milk; its use for riding came later, around 1000 BC.
EARLY HARDPAN: The period preceding the Harappan civilization, circa 3200-2600 BC, also known as Early Indus. It comprises four regional traditions: Amri-Nal, Kot-Diji, SothiSiswal, and Damb Sadaat.
EASTERN NARA: A branch of the Indus flowing parallel to the Indus to its east.
ELAM: The region to the east of Babylonia, in southwestern Iran, comprising both highland and lowland zones.
ELATE; A language spoken by the people of southwestern Iran, the inhabitants of Elam; it possibly shared a common ancestor with Dravidian, Proto-Elamo-Dravidian.
ERNESTINE: A very hard stone, made by heating a rare type of fine-grained mottled metamorphic rock that contained titanium oxide. This was em- ployed by the Harappans to make bits for the microdrills used to perforate beads of hard stone and in particular the exceptionally long carnelian beads. This stone has been named after Ernest Mackay, who made a detailed study of bead production, based on material from his excavations at Chanhu-daro.
ETCHED CARNELIAN BEADS: Beads made of carnelian bearing a design that falsely appears to have been etched. In fact, the design was created by bleaching the surface, which weakened the bleached areas, causing them eventually to erode away.
EYE-BEAD A bead made generally from patterned stone, such as banded agate, cut so as to create concentric circles or ovals on the surface, resembling an eye. Imitations of these were also made of other materials, such as painted terra-cotta.
FABRIC: A term used when describing pottery in the finished state, referring to the material of which it is made and reflecting details of its composition, structure, surface treatment, hardness, color, texture, and other physical features.
FIELD SURVEY: A method of archaeological exploration that involves, among other things, the systematic traversing of a large area, collecting material from the surface to obtain information on the archaeological material that lies beneath, an exercise known as fieldwalking. Field survey also includes reconnaissance techniques such as aerial photography.
FIRE ALTAR: A rectangular clay-lined pit containing a clay stele, filled with ash, charcoal, and often terra-cotta cakes. In some cases there are associated animal bones suggesting that these were involved in a sacrificial ritual.
GABARBAND: *See* Bund.
GANDHARA GRAVE COMPLEX: A secondmillennium culture in Swat, with a range of distinctive funerary practices and material reflecting both local and intrusive cultural features, including the

GANESHWAR: Ganeshwar culture.
GANGES: The holy river of India, which rises in the Himalayas and flows south and east to a great delta in the Bay of Bengal.
GANGES-YAMUNA DOAB: The area between the Ganges and Yamuna Rivers.
GAUR: The South Asian bison *(Bibos gaurus)*, native to peninsular India but probably found as far north as Gujurat and possibly the Indus Valley in Harappan times. It may be among the animals depicted in Indus figurines and seals, or these figures may represent hump less cattle *(Bos taurus)*.
GHAGGAR-Hakra: A river, now dry, located in India and north-eastern Pakistan, known in India as Ghaggar and Hakra in Pakistan.
presence of horses.
A settlement of the Jodhpura**GHARIAL** The fish-eating crocodile *(Gavialus gangeticus)*, common in the Indus, a dangerous beast that can grow up to 6 meters (19 feet) long.
GUFKRAL: A settlement of the Northern Neolithic culture.
GUJARAT The region southeast of Sindh, comprising Kutch, Saurashtra, and the North Gujarat plain to their east, as well as the smaller region of South Gujarat.
HAKRA PERIOD: The period circa 3800-3200 BC when people from Baluchistan began settling in the Indus region.
HARAPPA Situated on the River Ravi in the Punjab, Harappa was one of the two first cities of the Indus to be discovered and the source of much that is known about the civilization, though many parts of the city were badly damaged by brick robbing. Occupation at the site began in the fourth millennium and continued till around 1300 BC.
HARP: The joint American-Pakistani Harappa Archaeological Research Project, begun in 1986.
HELMAND CULTURE: The third-millennium culture on the Helmand and Argandab Rivers and the large Hamun-i-Helmand lake in Seistan. The culture depended on irrigation agriculture and trade. Its main settlement was the city of Shahri Sokhta.
INDO-ARYANS: The speakers of Indo-Aryan who entered the subcontinent during the second millennium BC.
INDO-EUROPEAN: The large and widespread language family to which Indo- Aryan belongs.
INDO-GANGETIC DIVIDE: The area between the catchment basins of the Indus and Ganges Rivers. This is the relatively narrow corridor that connectes the Indus plain with the GangaYamuna plains. The Indo-Gangetic Divide has also been used as simply the DIVIDE in the text.
INDO-IRANIAN: The branch of the Indo-European language family that comprises the Iranian, Nuristani, and Indo-Aryan languages. These shared a common ancestor in Proto-IndoIranian, from which Old Iranian and Old IndoAryan diverged during the second millennium BC.
ISMEO: The Italian Istituto Medio e Estremo Oriente.
JALILPUR: A fishing settlement in the Ravi Valley occupied during the Hakra and Early Harappan periods.
jHUKAR: A town in Sindh, occupied from the Early Harappan period to the period of decline, in the early second millennium, to which it gives its name.
jHUKAR CULTURE: The post-Harappan culture in Sindh and adjacent areas, marked by severe urban decline leading to the abandonment of many settlements.
jRlOFT: A recently discovered third-millennium urban civilization in the Halil River valley in southeast Iran.
jODHPUR-GANESHWAR CULTURE A hunterfisher-gatherer culture in the Aravalli Hills, who mined and smelted the region's copper ore from the late fourth millennium BC.
jOWAR: Sorghum *(Sorghum bicolor)*, an African millet introduced after 2000 BC and grown in northern Punjab in Pakistan and Saurashtra in India.

JUJUBE: Known in South Asia as *ber*, a tree *(Zizyphus jujuba)* that grows all over Pakistan. It yields an edible berry, gathered since early times, being known, for example, in the first period at Mehrgarh ca. 7000 BC. Its timber was used by the Harappans; a wooden mortar at Harappa has been identified as jujube wood.
KACHI PLAIN: An area protruding into Baluchistan and running north from Sindh, through which flows the Bolan River. The Bolan pass is one of the main routes into the hills of Baluchistan. Mehrgarh, situated on the Bolan River, is the earliest known farming settlement in the subcontinent.
KALIBANGAN: A town situated in Rajasthan, on the border of Pakistan with India.
KAYATHA CULTURE: A Chalcolithic farming culture in Madhya Pradesh who could have traded with the Harappans.
KECHI BEG PERIOD: The period 3800-3200 BC in Baluchistan, contemporary with Hakra on the Indus plains.
KHARIF: The wet season, from late May to September, when summer crops such as rice and millet are grown. During this period, heavy rains are brought to many regions of the subcontinent by the prevailing southwest monsoon winds.
KISH An important northern Sumerian city.
KOKCHA: A river tributary to the Amu Darya; Shortugai was located near the confluence. The Kokcha gorge was probably the main source of lapis in antiquity.
KOT DIJI: A settlement of the Early and Mature Harappan periods situated near the important flint source of the Rohri Hills.
KOT DIJI PHASE The most extensive Early Harappan regional culture, occupying an area including northern Baluchistan, Cholistan, and the Punjab. Though it developed into the Mature Harappan civilization on the plains, in the northern borderlands it continued throughout the later third millennium as the Late Kot Diji culture.
KULLI CULTURE: A culture in southern Baluchistan contemporary and closely associated with the Harappan civilization.
KUTCH: The northwest lobe of Gujarat, now divided from the mainland by the marshy Ranns of Kutch, but in Harappan times an island. **LAGASH:** An important Sumerian city-state, prominent in the period between the Akkadian and Ur III empires.
LANGNAJ A long-lived hunter-gatherer camp in North Gujarat, whose inhabitants probably acquired domestic animals as well as some small manufactured goods from the Harappans.
LAPIS LAZULI: A beautiful and highly valued blue stone, mined in Badakhshan in Afghanistan; its supply was controlled by the Harappans in the later third millennium. A stone similar in appearance was available in the Chagai Hills in western Baluchistan.
LATE HARAPPAN PERIOD: The Post-urban or Late Harappan period, from around 1900 BCE. It saw the disintegration of the Harappan state and the decay and abandonment of cities and towns. The effects were most marked in Sindh, the Makran, Kutch, and Cholistan. In Indian archaeological literature, Late Harappan also include the post-Harappan period.
LOST WAX CASTING: investment casting using a wax pattern/mold
LOTHAL: An important trading and manufacturing town in Gujarat, established on the southern Harappan border, at the interface with lands inhabited by hunter-gatherers and rich in gemstones such as agate and carnelian. A brick basin interpreted as a dock may reflect involvement also with the town but with some mature Harappan architecture,
LOTESHWAR: A hunter-gatherer camp in Gujarat perhaps occupied by the sixth millennium and certainly by the fourth when, as well as hunting game, the inhabitants kept domestic animals acquired from their farming neighbors and made their own styles of pottery.
MADDER: A perennial herb *(Rubia tinctorum)* with lanceolate leaves producing a red pigment used

for dyeing linen, wool, cotton, and leather, using alum as a mordant. The hue produced can be varied from brown through red to violet by adding different metals. Its use is attested to at Mohenjo-daro.
MAGAN: The name by which the Oman peninsula and southern Makran was known to the M e s opotamians. Its inhabitants mined the substantial deposits of copper ore in its interior and t r a d e d with Mesopotamia, Bahrein, the Indus, and probably southern Arabia and East Africa.
MAKRAN: The inhospitable coastal region between the Arabian Sea and Baluchistan. Its main attraction is its good anchorages.
MALACHITE: a green copper mineral; basic copper carbonate
MANCHAR LAKE: A large lake in Sindh, massively extended annually by the flood- waters of the Indus.
MARGIANA: The region of the Murghab River in northern Afghanistan.
MARCHER: A species of wild goat *(Capra falconeri falconeri)* native to Baluchistan.

MATURE HARDPAN (Indus) PERIOD: The period circa 2500-1900 BCE when the Indus civilization was at its height.

MEGASTHENES: A Greek envoy to the court of the Mauryan emperor Chander-gupta Maurya, whose account of what he saw there is an important source on early Indian history.

MEHRGARH: A long-lived settlement in the Kachi plain, founded around 7000 BC. It is the only early farming site of this antiquity known in South Asia. It was abandoned in favor of Nausharo in the Mature Harappan period.

MELUHHA: The name by which the Indus civilization was known to the Mesopotamians.
MESOPOTAMIA: The lands watered by the Tigris and Euphrates, now lying mainly in modern Iraq but also including parts of Syria. It was divided into a northern part, Assyria, and a southern, Babylonia, the latter divided into Akkad in the north and Sumer in the south. It was in Babylonia that civilization emerged in the late fourth millennium.
MAINSAIL: An south of the Salt Range, probably established to manage the supply of salt down the Indus to the Harappan heartlands.
MICROBEADS: Tiny steatite beads 1-3 millimeters in diameter.
MILLET A general term for a large number of genera of small-seeded cereals. Some were native to India and were domesticated there; many of these also oc- curred in Southeast and East Asia. Others were introduced from Africa or Arabia around 2000 BCE. *See* Bajra; Jowar; Ragi; Kodon; Broomcorn Millet; Foxtail Millet; Bristley Foxtail Millet; BroWTItopMillet; Little Millet; Job's Tears.
MOHENJO-DARO: One of the two great cities of the Indus, first discovered and excavated in the 1920s, situated beside the Indus in Sindh. Among its unique features is the Great Bath. *See also* Moneer Area; DK Area; HR Area; VS Area.
MONEER AREA: A section of Mohenjo-daro's Lower Town (also known as DK- I), excavated by Q. M. Moneer and K. N. Puris in 1933-1938 but unpublished until the area was reinvestigated by the Aachen team in the 1980s. Situated in the southeast of the mound, the Moneer area has proved to be a major industrial quarter of the city.
MORDANT: A chemical added to a dye to make it colorfast.
MIFFLIN: A wild sheep *(Ovis orientalis)* found in the high mountains of northern South Asia.
MOUND AB: The badly damaged citadel mound at Harappa.
MOUND E/ET: The main residential and industrial area excavated at Harappa. Early settlement in

mound E expanded to the east to form mound ET.
outpost settlement located just
MOUND F: The area between the citadel mound and the river at Harappa. Its architecture included the so-called granary.
MUNDA: A branch of the Austro-Asiatic language family. Its languages are now spoken only by tribal groups in central India.
MUNDIGAK: A town in the Kandahar region of northern Baluchistan, situated at the intersection of a number of important routes. Around 2600 BCE it be- came incorporated into the Helmand culture.
NAGESHWAR: An industrial village in Gujarat where shell was worked.
NAGWADA A village in Gujarat where beadmaking and shellworking took place. Early Harappan burials are also known there.
NAL CULTURE: *See* Amri-Nal Phase.
NAMAZGA CULTURE A culture flourishing in southern Turkmenia contemporary with the Harappans. Harappan material has been found at Altyn-depe, one of its principal towns.
NAUSHARO: A town in the Kachi plain that flourished through the Early and Mature Harappan periods, superseding Mehrgarh.
NILGAI: An antelope *(Boselaphus tragocamelus)*, also known as blue bull.
NORTHERN NEOLITHIC A farming culture in Kashmir contemporary with the Early and Mature Harappans, with whom they traded. There is some evidence suggesting that they also had distant trading links with China.
OCP: A culture of the second millennium, in part a successor to the Jodhpura- Ganeshwar culture, characterized by Ochre-Colored Pottery and also responsible for depositing hoards of copper artifacts. *See* Copper Hoards.
OCCUPATION DEPOSITS : A t each level of the excavated site there will be evidence in form of pottery etc. to show that the site was occupied. These deposits are called occupational deposits.
ONAGER: The wild steppe ass *(Equus hemionus)*, locally known as the khur, na- tive to northwest South Asia, including Gujarat. It is likely that the equids identified at a number of Indus sites were hunted
PIPAL: The *asvattha*, or Bodhi tree *(Ficus religiosa)*, a tall tree with heart-shaped leaves, which has had a religious significance in South Asia probably from pre-Harappan times.
PIRAK: An important post-Harappan settlement founded on the Kachi plain around 1700 BC.
POST-URBAN HARPPAN PERIOD: A cultural period that is after the demise of the Harappan Civilization, such as Cemetery H cultural period in Punjab.
PRE-HARAPPAN PERIOD: An alternative, but less satisfactory, term for the Early Harappan period.
PRIEST-KING: The famous stone sculpture from Mohenjo-daro, the broken torso of a robed male.
PRIMARY STATE: Also known as a pristine state, one of the small number of states that emerged first in their region and without the influence of prexisting states: these are usually listed as Mesopotamia (Sumer), Egypt, the Indus, China, and the civilizations of Mesoamerica and the Andean region.
PROTO-ELAMITE: The script briefly used by the Elamites circa 3200-2800 BC, a period when they were active in the Iranian plateau.
PULSES: Also known as legumes; a large range of crops, including various peas, beans, and lentils. The Harappans grew both native species, such as green gram and black gram, and pulses introduced from West Asia and Africa.
PUNJAB: The region of five rivers (Jhelum, Ravi, Chenab, Sutlej, and Beas) that are tributaries of the Indus, flowing west from the Himalayas. A state by this name also exists in India, adjacent to

Punjab in Pakistan.
RABI: The dry season, from October to late February, during which winter crops such as wheat are grown.
RAKHIGARHI: A settlement established in the Early Harappan period, which became the city of the eastern region in the Mature Harappan period.
RANNS: The Great Rann and Little Rann, an area of seasonally flooded salt flats on the north and east of Kutch. In Indus times these were open water.
RAVI PHASE: The earliest period of occupation at Harappa, corresponding to the Hakra phase in Cholistan.
REHMAN DHERI: An important town in northern Baluchistan during the Early Harappan period.
RIGVEDA (RgVeda*):* The earliest of the collection of sacred texts making up the *Vedas*, dating from around 1700/1500-1000 BCE.
RING STONE: A large stone ring, used as part of a pillar.
ROPAR (Rupar, Rupnagar): An outpost settlement on the Sutlej River in the Himalayan foothills, probably situated to manage the export of Himalayan timber downriver.
SARASVATI: A mythical river from Rigged, now commonly associated with the Ghaggar-Hakra river, currently dry.
SARGON OF AKKAD: (2334-2279 BCE): Founder of the Akkadian empire.
SAURASHTRA: The southern peninsula of Gujarat, also known as Kathiawar. In Harappan times it may have been divided from the mainland by perennial water in the Nal Depression.
SHAHR-I SOKHTA: A major town on the Helmand River south of the Hamun-i Helmand in Seistan, founded around 3200 BCE,particularly involved in the lapis trade. By 2400 BCE,Shahr-i Sokhta was a city of about 150 hectares, but it declined from 2200 BCE.
SHIVA: One of the principal Hindu deities, associated both with destruction and with fertility.
SHORTUGAI: Established 1,000 kilometers from the Harappan heartlands to con- trol the supply of minerals from the Amu Darya-Kokcha Valleysof northern Afghanistan, especially lapis but probably also tin and possibly gold.
SILT: Material deposit from a flowing river on the banks.
SINDH: The region of the lower Indus, east of Baluchistan, also spelt as Sind.
SISSOO: A tree*(Dalbergiasissoo)* found both in the Indus Valley and in the surrounding mountains, used as timber for construction, furniture, and tools, locally known as Shisham.
SLOW WHEEL: An early device that aided pottery production, also known as the tournette or turntable. This was a flat disc set on a pivot or spindle, which was turned by hand, allowing pottery to be rotated during its manufacture or decoration. It could not, however, be used for throwing pottery; this was only possible with the more sophisticated fast wheel (or potter's wheel), a later invention.
SMELTING: fusing or melting to separate metal from ore
SOTHI-SISWAL PHASE: The Early Harappan period in the eastern region. Pottery of the SothiSiswal types continued in use throughout the Mature Harappan period and into the Posturban period, a fact that makes it difficult to date sites in this area from surface collected material alone. Sothi-Sisal pottery has strong resemblance with the Kot Diji ceramics. Necause of this some archaeologists do not recognize Sothi-Sisal as a a separate phase.
SOTKA KOH: A town in the Makran, probably a Harappan port. It has not been excavated, but exploration has revealed the remains of many houses and kilns in an unwalled settlement. A possible wall suggests that there was also a fortified settlement.
SPINY MUREX: A shellfish *(Chicoreus ramosus)*. Its shells were used by the Harappans mainly to make ladles.
STEATITE Soapstone. It was used by the Harappans particularly for making seals, but also for

making inscribed miniature tablets and beads.
STONEWARE BANGLES: Small, very finely made ceramic bangles imitating mottled stone. The managed conditions of their firing suggest they were official insignia of some kind.
SUKKUR HILLS: A limestone outcrop in Sindh, divided from the Rohri Hills by a gorge through which the Indus now flows.
SUMER: The southern part of Babylonia, home of the first city-states.
SURKOTADA: A fortified Harappan town in Kutch, probably with unwalled suburbs. Early Harappan burials were also found there.
SUSA: An ancient city, capital of Elam.
SUTKAGEN-DOR The westernmost Harappan settlement in the Makran, probably a port, important for trade through the Gulf.
SWAT: The mountainous region north of Punjab and west of the Indus through which runs the Swat River, later known as Gandhara. The inhabi- tants of this region had links with those on the Indus plain, but their culture was often very different.
TAMARISK A scrubby tree *(Tamarix* spp) that can grow on sandy and saline soils and is found in Gujarat and the Indus Valley.Used by the Harappans for fuel, it yields a wood that can also be made into building fixtures such as doors, tools, and other objects.
TANK: An artificial pool or cistern created to retain water for irrigation and other purposes, including drinking water.
TEPE YAHYA: A town in the Kerman region on the Iranian plateau, a partici- pant in the trade networks, particularly involved in the manufacture of bowls and other goods from the locally abundant chlorite.
TERRA-COTTA CAKES: Triangular objects of well baked clay. For a long time their function was a puzzle; it seems now that they were used both for retaining heat in kilns and hearths and for paving.
THAR: The Great Indian Desert, which forms the southern boundary of the greater Indus region.
THARPARKAR: An area of seasonal grassland linking Sindh with Gujarat.
TURKMENIA: The area of Central Asia to the west of the southern half of the Caspian Sea. It was occupied in Harappan times by the Namazga culture.
UMM-AN-NAR: A settlement in Magan (Oman) whose inhabitants lived by fishing and by trading copper ore from the interior with people from Mesopotamia and Dilmun, either in situ or by traveling to those countries. This site gives its name to the local culture of the later third millennium.
UR: One of the principal cities of Sumer, a major port in the third millennium.
UR III EMPIRE: Established in 2112 BCE, the Ur III empire incorporated Sumer and Akkad and a large area to the east, reaching its peak under Shulgi (2094-2047) and declining under later kings until 2004, when the Elamites sacked Ur.
URIAL: The wild sheep *(Ovis vignei)* native to the Indo-Iranian borderlands and regions to the west and north. It was not ancestral to the domestic Ovis aries.
VEDAS: Four books of Indo-Aryan religious texts that are the earliest extant Indian literature. They were transmitted orally by faithful repetition and committed to writing only around 1000 CEoStrict Brahminical tradition dic- tated that the *Vedas* be memorized perfectly and transmitted without the slightest change. The oldest book is the *Rigveda*.
VS AREA: A residential area in the southwest of A residential area in the southwest of 1926 by M. S. Vats, who also excavated at Harappa, 1926- 1934.

WATER BUFFALO: The wild *Bubalus arnee* and the domestic *Bubalus bubalis* were probably both exploited by the Harappans, particularly for their rich milk.

ZEBU: *Bos indicus*, the humped cattle of the subcontinent, probably domesticated from the now extinct wild *Bos namadicus*.